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Contents

NOTICES :—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Dr. Casale's Visit

ALL who have followed recent developments in the nitrogen fixation field will be interested to hear of the visit of Dr. Casale to London this week. We hope to publish full particulars of the purpose of the visit next week ; in the meantime it may be stated that Dr. Casale is here at the invitation of Dr. J. F. Crowley, with whom the late Dr. J. A. Harker, who served as organiser of the Nitrogen Products Committee of the Ministry of Munitions, was professionally associated. Dr. Casale, of course, is widely known by name as the inventor of one of the three best-known processes for the fixation of atmospheric nitrogen, though no attempt, we believe, has hitherto been made to introduce his process in this country. The remarkably successful plant at Billingham is understood to be based on the Haber process, though the original work put into it by British chemists and engineers probably would entitle it to be more accurately described as the Brunner-Mond process. At one time it seemed probable that the French process of M. Georges Claude would be introduced here, the British rights in the process being obtained by a company which, however, afterwards failed. Latterly, we understand, a strong British financial interest has been aroused in Dr. Casale's company, the only one of the kind, we are informed, controlling international patents and representing world-wide interests in which British finance plays a responsible part. Dr. Casale's visit is naturally an event of great chemical interest, and we hope in due course to be able to give fuller particulars respecting it.

The Kinetics of Stone Decay

IN these days, when public attention is directed periodically to the instability of public edifices, there is an inclination to overlook the problem of the decay of stone buildings, which is hardly less serious in some respects than the aspect of structural insecurity. The failure of building stones is due not to one cause but to several. Selection of the proper materials is of vital importance. The use of iron dowels, which rust and expand, splitting the stone, should be discountenanced. Above all, atmospheric influences cannot fail to have an injurious effect. Attempts to mitigate the pollution of the atmosphere are to be commended, because an immeasurable amount of benefit must accrue. The combustion of raw fuel, which gives rise to smoke and sulphurous acid, should be forbidden. The severity of our fogs would be reduced, a purer atmosphere ensured, and our buildings given an added life.

Recent investigations by Messrs. J. J. Fox and T. W. Harrison show that the decay of stone may occur in three important ways—(1) atmospheric action of a mechanical nature ; (2) chemical action ; and (3) the action of living organisms. The agencies operating under the first class are the abrasive action of wind and rain, the splitting effect of frost, and the disintegration consequent on fluctuations of temperature. Various forms of chemical action are responsible for serious corrosion. Although the stability of the structure may not in the main be affected, disappearance of carved work, the flaking of surfaces, and general disfigurement result. Oxygen, carbon dioxide aided by moisture, nitric acid, sulphurous and sulphuric acids all contribute to the promotion of corrosion. It has been found that the action of gaseous oxides of sulphur absorbed by wet stone is materially assisted by the decomposition of soot. Water is, singularly enough, the most potent auxiliary to the other agencies of decay. It absorbs and carries the corrosive constituents of the atmosphere into the stone substance.

Outside urban areas, chiefly, lichens may play some important part in breaking up the surface of the stone, and it is also suggested that nitrifying bacteria may contribute to the disintegration of cement. The subject of bacterial action on stone is now under investigation by the Building Research Board. Investigations have been directed to the discovery of a mode of treatment which will protect stone from corrosive substances, but so far no success has attended these efforts. The selection of a universal stone preservative is not an easy matter, and some time will

undoubtedly elapse before something really satisfactory is discovered. Meanwhile, those who are chiefly concerned with the matter can, with advantage, advocate the use of smokeless fuels, confident that the abatement of smoke and the reduction of sulphur impurities which follow cannot fail to have a beneficial influence in the preservation of our public buildings.

A Great Emancipator

THOMAS HENRY HUXLEY, the centenary of whose birth is to be celebrated on Monday next, was a great scientist in the stricter technical sense, but he was far more. He is perhaps best described, as he is in Professor J. A. Thomson's admirable appraisement in *Discovery*, as "one of the great modern emancipators"—a man who touched the thought and life of his time with a most quickening and often disturbing effect, who used the truth he found in science to destroy all blind idolatry of dogma and habit, and who set men, especially in the matter of religious faith, searching for other and surer foundations than those he had unsettled. He was in the best sense a preacher to his generation of a new and fearless gospel of truth, and the minds were few indeed which did not feel the challenge of his message. It was he who gave to Darwin's theory of evolution its wider and more general applications and introduced a new fashion in thinking and belief.

No one, it has been suggested, ever had a greater "passion for veracity, a greater reverence for the facts." The conclusion, he held, that outstrips the evidence is not only a mistake but a crime. It is not crying "freedom of thought" that liberates; it is the truth that makes us free. There is need to-day, Professor Thomson reminds us, to learn from Huxley the lesson of building on facts. He liked Bacon's aphorism—truth sooner to emerge from error than from confusion. "Next to being right in this world," he once said, "the best of all things is to be clearly and definitely wrong, because you will come out somewhere. If you go buzzing about between right and wrong, vibrating and fluctuating, you come out nowhere; but if you are absolutely and thoroughly and persistently wrong, you must, some of these days, have the extreme good fortune of knocking your head against a fact, and that sets you all straight again." This was the arresting style with which he caught every ear. Science to-day has men as great, perhaps greater, as investigators; it has none with so fascinating a gift of exposition. Those who knew or read him in his lifetime will have quickening memories revived by these centenary celebrations; those who have come after will be the better for learning something of what he did to save the new thought of his day from the current forms of bondage.

The Purity of Metallurgical Coke

THAT the iron producer is beginning seriously to turn his attention to the auxiliary products which he uses is emphasised by an editorial article in the current issue of our contemporary *The Engineer*. There can be no doubt that under the stress of prevailing circumstances the iron and steel industries have got to turn their attention to details and give careful consideration to all possible sources of economy. One such economy which has found favour in the eyes of ironmasters is the purchase of coke by analysis, instead of by mere reputation or by the current market quotation. It is understood that in some parts of the country the practice is already in force of adjusting the final price in accordance with the quality, the actual determining factor being the proportion of ash present. According to our contemporary the new scheme involves the sale of metallurgical coke on a 10 per cent. ash basis, with a *pro rata* adjustment in price for every one per cent. of ash above or below the standard figure.

Such an arrangement would in many ways appear to be a fair one from the points of view of both producer and consumer; on the face of facts it would seem perfectly equitable, and, moreover, it would probably react greatly to the advantage of those producers who, owing to the particular type of coal upon which for reasons of locality they are compelled to draw, may not have the best of reputations from the standpoint of quality. The arrangement, however, is not one which should be lightly embarked upon, and we feel that it is a matter which should be considered more or less informally between firm and firm rather than being set up as an established precedent binding upon all undertakings. One can, perhaps, visualise many pitfalls ahead in the way of obtaining really representative samples of a material such as coke in which each lump will almost show varying characteristics; there is the question of the expense of sampling and analysis, as well as possible arbitration, while above all there is the incidence of the coal supplier who would, we feel, be adamant were he in turn expected to supply to the coke producer on a basis of ash content. And surely it is the quality of the material received from the colliery which is almost solely responsible for the ash present in the final product?

The Commercial Uses of Magnesia

A FEATURE which is not without interest is the increasing attention given in recent years to magnesium compounds and their capability of being employed to a greater extent in industry. We have had quite a number of inquiries in connection with the possible applications of magnesia, and it is a general rule to find that interest in the main is centred round uses of the material other than those as a refractory. In the first place, of course, one cannot help feeling that there is a certain amount of romance about the present-day vogue for magnesium oxychloride cement, for the last few years have witnessed the application of this highly effective material on a comparatively large scale, and yet it was discovered and recommended by Sorel more than sixty years ago. This so-called "Sorel cement" depends upon the property of magnesia of combining with magnesium chloride in the formation of a basic salt which, when set, exhibits extreme hardness and durability. Accordingly, in modern house and factory construction, it has begun to take a well-merited place as a material for floors, etc., while it is also employed in the manufacture of emery wheels and

artificial stone. Experience has shown that if magnesium oxychloride cement is prepared with care (and it would seem that special attention in the selection and proportioning of the aggregate is imperative) then it is undoubtedly stronger than any other form of cement used for the same purposes, while in addition to its ability to take a high polish it possesses the advantages of being both fire-proof and water-proof.

In this direction alone there is little question that a great future lies in front of magnesia as a commercial article, apart from which, of course, it is in quite considerable demand as a lagging material for the thermal insulation of steam pipes, boilers, etc. Again, both the carbonate and oxide of magnesium find application in the rubber industry, in which they are used as accelerators in the process of vulcanisation and as compounding materials, while there is also some demand in the paper industry, and to a limited extent for pharmaceutical chemicals.

Crystal Structure of Ammonium Sulphate

THE importance of crystal structure in relation to sulphate of ammonia has been noted recently in these columns on more than one occasion. It has been urged that the conditions within the saturator govern, to a large extent, the crystal structure of the sulphate produced. We now gather that a microscopical examination of the salt as it comes from the saturator and as it is discharged from the centrifuge reveals a large increase in the number of very fine crystals. It has been suggested that this is due to a reduction of the temperature of the magma on the draining board. Other technicians have observed that the interposition of a "drainer" between the saturator and the centrifugal is not only unnecessary, but a distinct drawback. With this piece of apparatus there is a tendency to occlude mother liquor and to create difficulties in the neutralising process. If, in addition, the formation of fine crystals is promoted, which must occasion difficulty in drying, then it is obvious that the well-established practice of ejecting to a "drainer" is distinctly unsound.

It is now proposed, in order to overcome the difficulties which the adoption of a "drainer" has revealed, to collect the hot sulphate from the saturator and store it in a steam jacketed vessel in readiness for centrifuging, an arrangement based largely on patents taken out by Dr. Lessing. If it is established that the crystals are formed outside the saturator and that the arrangement in question is intended to admit of very slow cooling, one can appreciate its advantage. On the other hand, if the jacketed vessel is to maintain the magma at the saturator temperature, and it is agreed that the crystals are formed outside the saturator, then the use of the new arrangement merely lies in increasing the productive capacity of the centrifuge. It must be remembered that many workers still hold the view that sulphate crystals are formed within the saturator and that the design of the latter apparatus must contemplate this important function. The whole problem is an exceedingly interesting, yet intricate, one, but it is certain that sooner or later the underlying factors in the production of sulphate of ammonia of a satisfactory crystal structure will be discovered.

Points from Our News Pages

The application of chemistry to confectionery and chemical reactions underlying some of the manufacturing processes are indicated (p. 426).

The superphosphate inquiry is still unfinished and a report of the latest evidence is given (p. 427).

The inquest on a chemical works manager is reported (p. 428).

Mr. A. M. O'Brien, F.I.C., read a paper before the Institution of Chemical Engineers on "Continuous Distillation of Petroleum" (p. 429).

A letter is published on "Patents in Irish Free State" (B. J. King) (p. 430).

Mr. B. D. Porritt, in a paper, dealt with problems affecting the paint and rubber industries, and mentioned the resemblance between rubber and drying oils in certain conditions (p. 431).

A chemist's claim in connection with a process for obtaining toluol from coal gas is noticed (p. 435).

The death is announced of Messrs. Alexander Reid, F. D. Bain, E. G. Proulx, G. W. Davison, and Mrs. Brunner (p. 436).

The London chemical market is quiet with export inquiry slightly better (p. 441).

Our Scottish market report shows a better tone and more inquiry in the Heavy Chemical Market. Acetic acid is cheaper (p. 444).

Books Received

BRITISH CHEMICALS: THEIR MANUFACTURERS AND USES. The Official Directory of the Association of British Chemical Manufacturers. London: Ernest Benn, Ltd. Pp. 212. 10s. 6d.

CHEMICAL ENGINEERING LIBRARY. Second series:—

The Dust Hazard in Industry. By W. E. Gibbs. Pp. 168. 6s.

Mechanical Mixing Machinery. By Leonard Carpenter. Pp. 136. 6s.

Agitating and Stirring Machinery. By Hartland Seymour. Pp. 140. 6s.

Acid-Resisting Metals. By Sydney J. Tungay. Pp. 136. 6s.

Published by Ernest Benn, Ltd., London.

The Calendar

1925		
May 4	Royal Society of Arts. Howard Lectures: "Motor Fuels." Professor J. S. S. Brame.	John Street, Adelphi, London.
4	Royal Society of Arts (Howard Lecture III): "Motor Fuels." Professor J. S. S. Brame. 8 p.m.	John Street, Adelphi, London.
4	Society of Chemical Industry (London Section). 8 p.m.	Burlington House, Piccadilly, London.
4	Royal College of Science Association: "Thomas Henry Huxley." Professor E. B. Poulton. 5 p.m. Conversazione.	Exhibition Road, South Kensington.
4-8	Twenty-ninth Chemists' Exhibition.	Holland Park Hall, London, W.
6	Institute of Metals. Annual May Lecture: "The Motion of Electricity in Metals." Professor Dr. H. A. Lorentz. 8 p.m.	Institution of Mechanical Engineers, Storey's Gate, London, S.W.
6	Society of Public Analysts. 8 p.m.	Burlington House, Piccadilly, London.
7	West Yorkshire Metallurgical Society: "The Selection of Iron by Fracture and Chemical Analysis." 7.30 p.m.	George Hotel, Huddersfield.
7	Chemical Society. 8 p.m.	Burlington House, Piccadilly, London.
8	Institute of Chemistry (Belfast Section): Annual General Meeting.	Queen's University, Belfast.
14	Oil and Colour Chemists' Association: "Artists' Colours." Dr. P. May.	8, St. Martin's Place, Trafalgar Square, London.
20	Society of Glass Technology.	London.
21	Chemical Society. 8 p.m.	Burlington House, W.
27	West Cumberland Society of Chemists and Engineers. Discussion: Smoke Abatement. Introduced by H. Hoy. 7 p.m.	Workington.

The Application of Chemistry to Confectionery

From a Correspondent

THE number of industries to which a knowledge of chemistry can be applied is ever on the increase. One of the most recent "recruits" in this respect is the industry concerned with the manufacture of confectionery. In this article it is the aim of the writer to indicate the chemical reactions which underlie some of the manufacturing processes, and also to point out some of the duties of a chemist attached to this branch, with particular reference to the industry commonly known as "sugar boiling." According to the census of 1921 the number of chemists engaged in sugar confectionery is given as ten, while a slightly larger number appear as taking part in the manufacture of chocolate, cocoa and allied products. These numbers have been increased since that year, and, as will be seen later, the realisation of the value of a scientifically trained mind from the points of view both of routine and analytical work will undoubtedly give rise to a further absorption of chemists into this particular industry.

Chemistry and Sugar Boiling

The art of sugar boiling has been practised for many centuries, but it is only in recent years that the chemical nature of the process has been fully realised. The wonderful and varied effects produced in the different sugar confections are the result solely of experience and knowledge handed down from generation to generation. Nowadays, the manufacturer is beginning to realise that his industry can be put on a scientific basis, that chemical explanations can be given for the different results obtained in the manufacturing processes, and that by means of systematic scientific research difficulties can be overcome and developments made along lines which previously were thought impossible.

Although long standing in years and practical "rule of thumb" experience, the manufacture of confectionery is still young from the point of view of application of scientific methods. Its future development is in the hands of those chemists—routine, analytical and research—engaged in this industry, which has as its starting point the complex substances chemically grouped as "sugars."

In the technical sense, sugar stands for ordinary cane sugar or sucrose, while other members of the group occur in various sweetening agents used in the industry. Glucose as a pure solid is difficult to obtain and is rarely met with in this form. It is usually found in glucose syrup or corn syrup, a viscous liquid containing, in addition, dextrin and a certain amount of maltose. Molasses is the name given to the uncrystallisable liquid which remains after crystallisation of sucrose at the refineries, and according to its nature and colour is known respectively as black treacle, treacle or golden syrup. Its distinctive flavour is taken advantage of in certain sweets. Chemically it is a solution of sucrose together with some invert sugar and impurities derived from the juice. Honey, as a mixture of glucose and fructose, is also used to a limited extent. All these substances require an accurate chemical examination with respect to their quality and purity, as variations in their composition will speedily affect the results of manufacturing processes.

Solutions of sugar heated to different temperatures—say, from 240° F. and upwards—yield when cooled solids of varying solidity, depending apparently upon the proportion of sugar and water remaining after the heat treatment as well as on physical changes which occur in the molecule. In the confectionery trade advantage is taken of this to manufacture sweets which differ in their action in the mouth. As an example, the difference in the "biting" property of caramel and butterscotch can be considered, the former being a comparatively low boiled sweet. The "old hand" estimated the degree to which the sugar solution had been heated by testing it with his fingers, but nowadays it is realised that these physical results can be obtained by heating the solutions to definite degrees of temperature. On cooling down the solution of pure sugar cystallisation occurs, and by placing fruits or certain confections in the syrup they become covered with crystals, thereby being protected from the effects of atmospheric damp and oxygen. The slower the cooling of the sugar solution the larger will be the crystals obtained. In the case of confectionery "crystallising," comparatively large crystal are required, and also in the case of "sugar candy"; but usually small sugar crystals are desired for fondants, creams, etc. The latter are obtained by rapid crystallisation of the syrup—that is by quick cooling and rapid stirring.

The Importance of Crystallisation

Crystallisation, which of course occurs naturally when a concentrated sugar solution is cooled, is detrimental to most sweets, rendering them "candied," as it is known technically. To prevent this, advantage is taken of the effect of the addition of a small amount of acid to the solution which partly inverts the sucrose. The invert sugar so formed prevents cystallisation. Another method is to add corn syrup, which, being uncrystallisable, tends to prevent crystals forming, while its presence in the boiling sugar causes a certain amount of inversion to take place. Owing to the effect of the heat the colour of the corn syrup and sugar mixture turns yellow after a certain degree of temperature has been reached. This is the result of decomposition of the sugar molecule, which loses water and is converted into caramel or sugar dye. Further heating causes charring, due to the production of carbon, which ultimately will burn away without leaving an ash in the case of a perfectly pure sugar. Among the decomposition products evolved are carbon dioxide, acetone, formic acid, etc. The caramel, which is produced by heating to 360° F., is used as a dye in the confectionery and brewing trades.

In order to obtain a few extra degrees of temperature and still retain the colour, advantage is taken of the reducing properties of sulphur dioxide in solution. The amount of bleach used must be kept under strict chemical control, and a limit will probably be fixed in view of the recent report of the Commission investigating the use of preservatives in foodstuffs. Advantage is taken of the principle of supersaturation to produce a fine amorphous sugar used in the manufacture of chocolate.

Present-day confections depend largely for their sale upon appearance and taste, hence colours and flavours are important from the confectioner's point of view. Both classes of substances need to be in the hands of a trained chemist. The dyes suitable for use in foodstuffs are limited, and careful control is needed to see that their constitutions are in accordance with the legal standards of this country or any country to which the goods may be exported. Flavours, many of them entirely chemical in nature, have to be analysed and examined to see if they are suitable for the purpose for which they are required. Essential oils, which are used much for flavouring purposes, require expert examination to detect adulteration. The manufacture and purification of this class of substance comes within the province of the manufacturing chemist. Other points which come within the realm of the chemist are investigation of difficulties in routine process work, development of new lines, analysis of raw and finished goods with particular reference to the Foods and Drugs Acts, and supervision of chemically sound methods of packing, etc.

In an industry to which the principles of chemistry are being applied there is no limit to development, nor to the duties of a chemically trained mind employed in that line. In the above notes a few points have been briefly mentioned to indicate a relationship between chemistry and confectionery which in the future will be of immense value both to the manufacturer and to the general public.

United States Ten Per Cent. Potash Production

DR. JOHN E. TEEPLE, at a recent meeting of the American Chemical Society, said that if Muscle Shoals were converted into a plant for producing nitrogen from the air it would never produce a sufficient quantity to make any appreciable difference in the cost of fertiliser to the farmer. America still took almost as large a proportion of potash from Europe as it did before the war, in spite of what has been said since the war about the independence of America in that respect. Ninety per cent. of the potash which is used as fertiliser comes from Germany and from Alsace, which France recovered as a result of the war. "Only 10 per cent. of what we use is produced in this country," said Dr. Teeple.

Proposed Protective Duty on Superphosphate

Committe's Inquiry Resumed

THE Committee (presided over by Sir Arthur Whinney) which is inquiring into the application by the Fertiliser Manufacturers' Association, Ltd., for a duty on imported superphosphate, resumed its sittings on Monday, April 27.

Merchants' Terms

At the commencement, the Chairman read a letter from Mr. C. W. Higgs, of Pattullo Higgs and Co., of Orpington (merchants), which referred to a statement made in evidence by Mr. A. N. Gray (commercial manager and joint secretary of the Fertiliser Manufacturers' Association), to the effect that the advantage of the present low price of superphosphate did not go to the farmer, but nearly all of it to intermediaries. This, said the writer, was not a fact, and he, as chairman of the Fertilisers' Committee of the National Association of Corn and Agricultural Merchants, wished to take immediate steps to deny it. In support of this, he quoted the Lawes' Chemical Manure Co.'s net merchant terms for superphosphate and his own company's net prices to farmers. These showed that the prices varied only by from 1s. 3d. to 3s. per ton. No agricultural merchant, he said, could meet his selling expenses if everything he sold showed so small a profit as did superphosphate. If the manufacturer could sell as cheaply as could agricultural merchants, he would do so without hesitation. The reason why agriculturists could sell more cheaply than the manufacturers was because the former sold so many different commodities that they were kept employed throughout the year, whereas the manufacturers' selling organisation would only be employed for two short seasons in the year. Furthermore, the agricultural merchant purchased the farmer's produce, and thus had many opportunities for collecting payments for that which he sold to the farmer.

A French Disclaimer

Mr. ALFRED ELLIS (representing the National Farmers' Union) said that he had received a letter from the French Commercial Attaché in London with reference to another statement made by Mr. Gray, to the effect that the French Government were seeking to exercise pressure on the North African phosphate mine owners with a view to French customers being granted lower prices than those quoted to foreign buyers. The writer said he had been directed by the French Ministry of Commerce to make it clear that the adoption of the alleged policy had never been contemplated by them. Further, the mines were situated not only in Algeria, but also in Tunisia and Morocco, which were not colonies, but protectorates, and the mere possibility of imposing preferential prices was, in any case, out of the question.

Sir CASSIE HOLDEN (for the Fertiliser Manufacturers' Association), referring to Mr. Higgs's letter, said it was assumed by Mr. Higgs that the charge was made in respect of the English manufacturers' product, but it was the importer of the foreign superphosphate that Mr. Gray had referred to.

A statement was then handed in to the Committee on behalf of Mr. Gray (who was unable to attend the inquiry owing to illness) giving particulars with regard to production in Belgium, and containing information with regard to the Superphosphate Standaert Société Anonyme, of Ghent, of which Mr. Gray was commissaire. These statements were not dealt with in detail.

Employment Figures

Another statement had relation to the number of men employed in the manufacture of superphosphate in this country. It gave the number of men employed each week from July 1, 1923, to June 30, 1924, and the average number was 5,551·9 (the previous estimated figure given of the number of men employed in the industry for this period was 16,000.)

Sir CASSIE HOLDEN said that the figures were based on returns from manufacturers whose output represented 65 per cent. of the total output of the country. At the same time, the figures did not really represent the total number employed, because they did not take into account those engaged in selling, in cartage, or anything except the actual manufacture of superphosphate. He admitted that the previous figure of 16,000 was wholly wrong. The 5,551 did not seem to be a very formidable army, but he relied on the fact that the number of men employed throughout the year was substantial, and that, coupled with the nature of the goods produced in the making of this superphosphate, made the industry of substantial importance.

Sir HENRY REW, a member of the Committee, said the detailed statement showed that the number of men employed per week varied throughout the period from 4,500 to about 8,000. It could be taken, therefore, that the number in regular employment was 4,500, and that at times of pressure that figure was swollen to about 8,000.

Sir CASSIE HOLDEN said that was a fair conclusion.

Depreciated Currency

The CHAIRMAN, referring to the question of depreciated currency abroad, said it was laid down in the instructions to committees that competition for the purpose of such inquiries was not to be deemed to be unfair unless it arose from depreciation of currency operating so as to create an export bounty; subsidies, bounties or other artificial advantages; or inferior conditions of employment of labour. He did not think it was sufficient, in order to prove that, to compare the value of the franc to-day with its pre-war value, because the conditions were not comparable. The fact that the Belgian manufacturer was able to sell at a lower figure than that of British manufacturers might arise from fair competition. Applicants for protection had to face a very great difficulty in showing what "export bounty" meant. He suggested that "export bounty" was the amount by which the exchange value of the franc exceeded the purchasing value in Belgium of £1 sterling when expressed in terms of francs.

The CHAIRMAN announced that the Central Chamber of Agriculture desired to give evidence before the Committee, and had submitted a précis of evidence. Also, application to be heard had been received from the Ulster Farmers' Union and the National Farmers' Union of Scotland.

Evidence by Mr. W. G. T. Packard

Mr. W. G. T. PACKARD (director of Packards and Jas. Fison (Thetford), Ltd., Ipswich) than gave evidence, in which he referred to the manufacturing equipment of British manufacturers, and outlined the process of manufacture. He emphasised that the superphosphate, when manufactured, had to be left in large heaps for conditioning, so that ample storage accommodation was required, and if they could manufacture and sell directly the storage accommodation would be materially reduced. As to the improvements and developments of processes and scientific research, he said the manufacture of superphosphate was controlled by chemists who were constantly at work at the factories to determine the proportions, etc., of the raw materials required for manufacture of superphosphate and many other matters calling for the attention of qualified technical assistants. Analytical and research work was regularly carried out in the larger works, many of which had fully-equipped laboratories for the purpose. In a few instances, where the equipment and conditions permitted, the laboratories undertook analytical work, free of charge, for farmers, such as soil analysis, for example, in order to determine the condition and needs of soils in regard to fertilisers. British manufacturers had brought their plant and methods up to date. He was of opinion that the farmer obtained British phosphate in a better condition than he did the foreign. The British manufacturer was bound to give a guarantee of water solubility, and it was necessary for him to dissolve the maximum quantity of soluble phosphate from the phosphate rock. That obligation with regard to solubility did not apply to the foreign manufacturer in his own country, but it did when he was selling in this country. The British manufacturer usually got a higher percentage of solubility. The manufacturers were not lagging behind in their methods of manufacture. The manufacturing industry had been conducted with economy and efficiency.

With regard to the plant, the rate of depreciation was serious owing to the nature of the work, and there was a considerable amount of renewals and repairs to be done every year. The process of manufacture was such that there was no waste of raw materials, the whole of which could, in the ordinary way,

be utilised. In recent years much progress had been made in reducing to a minimum the loss of sulphurous and nitrous oxide gases during the process of manufacturing sulphuric acid, and plant had been installed in several factories for the recovery of direct and by-products arising during the various processes. The capital sunk in the British industry he estimated at about £5,000,000, and the capital cost of buildings and plant was estimated at from £4 10s. to £5 per ton of capacity.

The CHAIRMAN said that a part of the case put forward by the Fertiliser Manufacturers' Association was that if the industry did not get assistance the manufacture of sulphuric acid might be endangered. He asked whether sulphuric acid was not a by-product of zinc manufacture, and whether in that case the manufacture of sulphuric acid would not be endangered.

Mr. PACKARD agreed that the manufacture of zinc involved the production of sulphuric acid as a by-product, but at the present moment the sulphuric acid production from zinc manufacture was nothing like the production in connection with superphosphate. Another point was that the sulphuric acid arising from the latter source was produced in various places all over the country, whereas that arising from zinc manufacture was produced only at the factory of the National Smelting Co. at Avonmouth. That factory was actually put up by the Government during the war. He did not think that zinc manufacture would produce all the sulphuric acid that would be needed at present in the event of war.

Scottish Evidence

Mr. P. BROWN, accountant to one of the leading Scottish firms of superphosphate manufacturers, gave evidence with regard to the costs of manufacture in that particular case. The figures, he said, were taken from the balance sheet of the company for the year ended June 30, 1924, and showed that the cost of manufacture was £4 5s. 9d. per ton at a time when the average selling price was £3 per ton. Depreciation was 6s. 9d. per ton. The plant capacity of the firm, he said, was 48,750 tons, but only 6,346 tons were produced during the period in question. The present plant capacity was probably double that of the pre-war figure, it having been largely increased in 1918 at the request of the Ministry of Munitions. The fact that the output was exceptionally small in the year mentioned accounted for the cost being so high.

Sir CASSIE HOLDEN said he was in a difficulty because his next and last witness, Mr. Garrod Thomas, general manager of the National Sulphuric Acid Association, was unable to come through illness. Mr. Thomas, however, had prepared a number of documents, including figures of cost of manufacture of sulphuric acid, which showed that the figure mentioned by the applicants was a conservative one, and these might be handed to the Committee and proved by affidavit later, if the Committee thought necessary.

The CHAIRMAN said he hesitated to accept evidence in that way.

Sir CASSIE HOLDEN, however, read a general statement by Mr. Garrod Thomas, giving certain figures.

After consultation, the Chairman said he did not think the evidence by Mr. Garrod Thomas could be accepted in its present form. Sir Cassie Holden thereupon withdrew it.

It was decided to meet again on Thursday, April 30, when the case for the applicants will finally be disposed of, and the hearing of the opposition begun.

Inquest on Chemical Works Manager

AN inquiry was held at Shoreham on Wednesday, April 22, into the death of Mr. G. P. Inglis, manager of the chemical works of Forbes, Abbott and Lennard.

Evidence was given that Mr. Inglis had lately been unwell, but that he had no business or financial worries. He was found dead in the works by the chief engineer on Sunday, and a tumbler containing cyanide of potassium was in his hand. The coroner returned a verdict of "Suicide while of unsound mind." Mr. Inglis had been in the employ of the firm for some eight or nine years, and was a respected member of the staff. He was 47.

A New Furnace Arch

[FROM A CORRESPONDENT.]

A VERY interesting and important development in furnace construction is what is known as the suspended firebrick arch, the principle of which consists essentially in constructing the roof of a furnace of standard interchangeable firebrick blocks attached underneath to heavy steel girders. In this way any width or shape of combustion chamber roof can be built without difficulty. There has recently been put on the market in this country the "Detrick-Usco" suspended arch, the original invention of M. H. Detrick, of Chicago, which is manufactured and supplied in Great Britain by the Underfeed Stoker Co., Ltd. Over 30 installations have already been supplied for water tube boilers.

The ordinary sprung arch such as is generally used to-day for furnace work, in the chemical industry for example, has a number of very serious practical disadvantages, the chief of which is that it cannot be made wider than about 8 ft.–9 ft. In the case of large water-tube boilers, therefore, a number of separate mechanical stokers have to be erected side by side, in, say, 2–4 different chambers, each of which must be less than 9 ft. in width because of the constructional limitations of the arch. This means a great waste of valuable combustion space, because of the heavy middle walls necessary to support the arches, and complications due to a number of separate stokers with fans and motors, whilst at the same time the curved shape of the arch is not theoretically the correct form for combustion. Thus it tends to make the flames and hot gases collect more at the top of the arch, and consequently to pass through the middle tubes only of the water-tube boiler, whilst more heat is deflected to the sides of the grate than to the middle in just the wrong way, since the travel of the coal is less at the sides because of the frication of the walls.

The disadvantages are obviated in the "Detrick-Usco" flat suspended arch in which, as already indicated, there is hung a series of special standard firebrick blocks, the whole forming a flat arch or roof which can be made any width without difficulty even up to 30 feet, simply depending upon the strength of the supporting steel beams. In the ordinary sprung arch the average life is only about 6 months, even under good conditions, when the whole arch has to be pulled down and re-erected, a costly proceeding. The initial cost of the suspended arch is certainly greater than the ordinary arch, but in reality there is no comparison in the nett cost after a number of years, quite apart from the question of the increased efficiency of the furnace.

Professor Brame on "Motor Fuels"

CONTINUING at the Royal Society of Arts, London, on Monday, his lectures on "Motor Fuels," Professor J. S. S. Brame dealt with the physical properties of motor spirit.

Alcohol, he said, might be truly described as a young fuel with an undoubted future. It would only come into its own when its elders—petrol and benzol—became exhausted.

Alcohol might be termed the only true artificial fuel, for it could be manufactured without having recourse to raw materials which were themselves fuels. It was admitted that present materials yielding fuel were not inexhaustible, and some day it would be necessary to manufacture fuel from other raw material. Availability and costs were the primary considerations, and to-day and possibly for many years alcohol could not be produced in sufficient quantity or at a price which would enable it to replace any appreciable fraction of petrol Grain was too valuable as food to be used for the production of alcohol. Other sources which had been used for commercial production or investigated, included waste starchy material found in straw and cellulosic material. Waste sulphite liquor from paper mills had been successfully used and it was estimated that Canada could produce 5,000,000 gallons from this source. Wood waste had also been investigated, also waste molasses from sugar refining. The vegetation of tropical countries offered the most promising source of material for furnishing inexhaustible quantities of fuel alcohol, and in dealing with that they would have to overcome problems of storage and transport.

Continuous Distillation of Petroleum

By A. M. O'Brien, F.I.C., etc.

At a meeting of the Institution of Chemical Engineers held in London on April 22 a paper on "Continuous Distillation of Petroleum" was submitted by Mr. O'Brien and led to an interesting discussion. Sir Frederic Nathan presided. The paper is summarised below.

THE fundamental principles of continuous, as opposed to intermittent, distillation, although generally accepted as being more economical, were not practised or followed in the strict conception of the term. In one of the earliest forms of continuous distillation on record—that of the late Mr. Henderson, of the Scotch shale oil industry—there were three stills in series, the oil being charged into the first, then gravitating to the second, with further gravitation to the third, a certain quantity of distillate being taken off in each still. Later a greater number of stills were used to complete the distillation down to the desired residual, and a greater number of distillate fractions were produced according to the number of stills in the unit. Taking an instance from the writer's own experience with an oil supposed to have contained 20 per cent. of naphtha, 30 per cent. of kerosene and 15 per cent. of a mixture of a kerosene and a waxy oil, more or less a solar oil with a wax in suspension, six still units were required. This number allowed for a working loss and gave a residual oil of 30-35 per cent. on the crude. Two stills gave off the naphtha—*i.e.*, the feed pipe was joined to two of the stills for the incoming crude oil, the residual was then gravitated into a common header for three stills, and the residue from these three gravitated into a single still in which the last fraction was taken off.

An 8-still Unit

A further modification came with the adoption of an 8-still unit, in which three stills were allocated for the naphtha or No. 1 distillate, three for No. 2, and two for the third cut, and followed subsequently, two stills for the first cut, four stills for the second, and two stills for the final distillate. There was undoubtedly an explanation for the variations, such as a change in the nature of the crude oil to be distilled—it containing more volatile and less of the standard residual at a subsequent date.

Considering the relationship of heating and evaporative surface to the quantity of oil to be distilled in a given time, Mr. O'Brien said that in the case of 6-still units the crude oil was charged into two stills, and a fraction equivalent to 20 per cent. of the crude oil to be distilled off. Each still had an evaporative surface of 133 sq. ft.; therefore two stills would have an evaporative surface of 266 sq. ft. Therefore 20 per cent. of distillate of the crude oil had 266 sq. ft. of evaporative surface allocated for that work. They then had three stills, equivalent to 399 sq. ft. of evaporative surface allocated to the work of 30 per cent. distillate off the crude oil, and finally the third fraction, representing approximately 15 per cent. on the crude oil, had only 133 sq. ft. allocated to the work. If they divided 266 by 20 they found that each per cent. of crude oil had approximately 13 sq. ft. of evaporative surface allocated to it in a given period of time. In the second fraction they had 30 per cent. with 399 square feet allocated to it in a given period of time, which again was approximately 13 sq. ft. to 1 per cent. on the crude oil. When they got to the third still, however, 15 per cent. was allocated to 133 sq. ft. This represented only 9 sq. ft. approximately for every 1 per cent. on the crude oil in the same period of time.

Obviously, when aiming at efficiency, it was not desirable to run a continuous distillation in a set of stills in which the rate of distillation was not identical in each section of the unit. In the above case the oil was going through continuously, but to harmonise the work, the 20 per cent. fraction and the 30 per cent. fraction had to be slowed down, or alternatively a rate of distillation per square foot of evaporative surface in the third section must be speeded up to half as much again as the rest of the units, and if 1 sq. ft. of heating surface could be tuned up to work at one and a half times the speed of the others, then the best work is not being obtained from the plant. The best work that could be obtained from any plant was the maximum amount of evaporation from every square foot of heating surface in a definite period of time. In any unit in which fluctuations such as the foregoing had been permitted, the best working condition was not being obtained, as the unit was not in harmony throughout the series.

Taking another aspect, supposing each of these stills had been allocated to take off, say, 11 per cent. on the crude oil; then 6 stills, multiplied by 11, would mean 66 per cent. distilled off the crude oil, and after allowing for loss by distillation, a fraction between 30-35 per cent. of residuum would be obtained. Here they had 100 per cent. being charged to the first still, from which 11 per cent. had been removed. Eighty-nine per cent. was then charged to the second still, and 78 per cent. was obtained as a residual, which passed to the third still. Sixty-seven per cent. emerged from this still as a residual and was passed to the next. From this still 56 per cent. was obtained as a residual, which again passed to the next still, whence 45 per cent. was obtained as a residual, and this was passed into the next final and last still, from which was obtained a residual of not more than 34 per cent., assuming no loss by distillation. It must be remembered that all the stills had been of the same size. Consequently, as the oil had passed through the unit, the quantity from one still to the other had been diminishing in volume, but the heating surface remained the same, and also the evaporative surface.

Did they get harmonious working under these circumstances? It must be remembered, Mr. O'Brien said, that as the distillation progresses, the temperature of each still increases; as the crude oil is not a substance of a definite boiling point, a most peculiar effect arises. Some people will tell you that the lighter products can easily be distilled—do not require so much heat, whereas, as a matter of fact, the specific heat of petrol is actually higher than that of lubricating oil. The difference is not very great, probably only varying the third place of decimals, but it still remains that it is slightly higher than the heavier products. The great difference, however, is that the vapour pressure is lower for the lubricating oil fraction than it is for the petrol fraction, but contrary to the expectations of some, the furnace temperature for the initial fraction is actually hotter than the final furnace. This is simply due to the fact that more B.T.U.'s per gallon of oil are necessary in the initial stages of the operation, as, without considering the use of pre-heaters, and assuming the oil charged is at, say, atmospheric temperatures, the whole bulk has to be raised to the boiling-point of the first fraction.

Continuous straight through Processes

Present-day continuous straight through systems consist in passing the petroleum or other liquid successively through a series of stills of equal dimensions, the liquid passing into the unit at the first still and the residue passing out from the last of the unit; the distillates from each still being condensed in suitable condensers. In these systems all stills, condensers and other auxiliaries are invariably of the same dimensions. This I have found to be a mistake, as although it may be intended to take the distillate off in equal fractions, to do so means that the rate of distillation must be eased off successively to allow for the reduction in volume passing successively from one still to another throughout the series.

For example, let us take, say, a bench of six retorts designed for a throughput of 60,000 gallons daily, distilling 48,000 gallons, and passing away 12,000 gallons as an effluent residuum: presuming it is intended to distil off equal volumes of distillates from each still—this presumption being justified by the fact that equal sized condensers have been fitted to each still—then we have the following, tracing the liquid through the bench still by still:—

Volume fed to	1st still	60,000	galls.	Distillate	8,000 galls.
,,	2nd ,,	52,000	,,	,,	8,000 ,,
,,	3rd ,,	44,000	,,	,,	8,000 ,,
,,	4th ,,	36,000	,,	,,	8,000 ,,
,,	5th ,,	28,000	,,	,,	8,000 ,,
,,	6th ,,	20,000	,,	,,	8,000 ,,
Effluent residuum,		12,000	,,	,,	48,000 ,,
		Add residuum			12,000 ,,
					60,000 ,,

If the distillation could be maintained at this equal distribution throughout the series, it stands to reason that the rate

of distillation is progressively altering. Furthermore, that if the first still can handle or cope with 60,000 gallons daily, it seems out of all proportion to build a still of the same dimensions to handle one-third of the quantity as is the case of the sixth still in the instance quoted. It is also fairly obvious that if the stills are of equal dimensions, and each in succession has a diminishing quantity put through throughout the series, the capacity of the stills being equal, an unnecessary volume of oil is kept at distillation temperature commencing from the second in the series up to the final still; this means a considerable loss of fuel. Thus it will be seen that a proportionate error exists throughout the series, and herein the principal feature of improvement lies.

The following is an example where an amount of 60,000 gallons is operated upon by means of six stills, a constant proportion of distillate being taken off each still :—

		Distillate. Galls.
Charged to No. 1 still,	60,000 gall. ..	14,118
Residuum from No. 1 to 2 still,	45,882 ,, ..	10,796
,, ,, 2 to 3 ,,	35,086 ,, ..	8,255
,, ,, 3 to 4 ,,	26,831 ,, ..	6,313
,, ,, 4 to 5 ,,	20,518 ,, ..	4,827
,, ,, 5 to 6 ,,	15,691 ,, ..	3,692
Effluent residuum equals		11,999
Total throughput		60,000

It will be seen from the foregoing figures that there is a perfect relationship throughout, obviously to the working advantage of the distillation and the products. This constant proportion of distillate can obviously be secured by proportioning rate of feed and temperature. It is, of course, also possible to arrange the volumes of the successive stills empirically by taking a sample of the oil and ascertaining the proportion of distillate under the conditions in which the successive stills work. The respective proportion of residuum can therefore be applied from this experimental test and the proportions of the stills calculated accordingly. As recorded previously, it is not necessary for the stills to be of equal dimensions, and in fact it is highly undesirable; therefore, by the system which is advocated, only 56·6 per cent. of total volume would be kept at distillation point as compared with 100 per cent. by the distillation system generally employed. I calculate as follows :—

All stills of equal dimensions. Capacity, say,		All stills progressively diminishing in capacity. Capacity, say,
100	No. 1 still.	100·00
100	2 ,,	76·47
100	3 ,,	58·47
100	4 ,,	44·71
100	5 ,,	34·2
100	6 ,,	26·15
600	Total capacity	340·00

∴ 600 : 340·00 : 100 X = 56·6 per cent. only kept at distillation point, as compared with 100 with all stills of equal dimensions.

Having brought out this feature, the following are automatically developed in consequence. The condenser tanks, instead of being of the same dimensions, are calculated and designed proportionately to deal with the dsitillates from each still. The condensers can be of any approved type, but must be so designed that the following feature is developed :—

1. Each condenser will necessarily be of diminishing size, as each successive still yields a diminishing volume of distillate.

2. The boiling point of the distillates throughout the series will increase with the passage of the fluid through the unit.

3. The lighter distillates are of the lowest boiling point and therefore possess greater volatility and require a considerable excess of water to cool them to avoid loss, and these distillates are obtained at the first still.

4. Therefore, by suitable adjustment of the inlets and outlets of the condensing water, the whole of the water required for the perfect condensation of the distillates from the whole unit can be made to pass into the condenser for the first still and then into the condenser for the second still and so on throughout the series.

By this means actually the very minimum of water only is required for the unit and much fuel saved in useless pumping of an unnecessary volume of water.

Further, the stills being of diminishing size, it is obvious less weight of metal work is required in their construction and in the pipe connections, which will diminish in diameter as the volume of oil passing through the unit decreases. Also less brickwork —fire bricks and ordinary—is required in the construction, less concrete for foundations, also less structural steel work such as buckstaves and binders, girders and supports for condensers, and finally less labour and time required in construction of the unit as a whole.

By means of a suitable flue and damper arrangements provision is made for the utilisation of the flue gases from any one still to assist in the heating of another. Thus the flue gases from the No. 1 still might be made to pass under the No. 2 still, thereby providing a considerable volume of gas at a very close temperature to that required under this still. The gas could be brought up to the temperature required by a small flame under the No. 2 still, and the effluent gases passed on to the third still and so on throughout the series. Or the procedure could be reversed, commencing at the hottest still and bringing the flue gases in a counter direction to the flow of the oil through the unit, the direction employed being controlled by the peculiar circumstances of each particular installation.

It follows that any plant can be calculated for a given throughput capacity if the following facts are settled—obviously by the exigencies of the circumstances :—1. The daily capacity in gallons of the plant. 2. The percentage of residual effluent. 3. The considered economical number of stills and/or fractions. 4. The standardised size of stills.

A discussion followed in which Messrs. N. A. Anfilogoff, E. Lawson Lomax, Ashley Carter, R. Lessing, A. L. Bloomfield, F. H. Rogers, A. J. V. Underwood, and Gordon Pitt took part.

Patents in Irish Free State

To the Editor.

Sir,—Probably it will be useful to those of your readers interested in Patents, trade marks, designs, etc., in Saorstat Eireann (Irish Free State) to learn that a Bill on the subject entitled "Industrial and Commercial Property (Protection) Bill, 1925," has now been introduced, and copies can be obtained through a bookseller or direct from the Government publishers, Eason and Son, Ltd., 40-41, Lower O'Connell Street, Dublin. The price is 2s. net per copy, plus 2d. to cover postage.—Yours, etc.

146a, Queen Victoria Street, London, E.C.4. Benj. T. King.

Magadi Soda Co.

Position and Prospects of the New Company

At the statutory meeting of the Magadi Soda Co., Ltd., held in London, on April 24, Mr. J. H. Gold, the chairman, said that owing to the debenture holders' action against the old company the possession of the company's property was put in the hands of the Receiver for the debenture holders. On February 28 that Receiver was discharged, but even then the company did not gain possession, because the Official Receiver was by the Court appointed to succeed him. The difficulty was, however, overcome by the appointment of the new company as special managers of the business of the old company, but they hoped that in a short time they would really be in possession of their property. They had re-engaged practically the whole of the staff which had been operating for the company in East Africa. The company would have the advantage of the co-operation in this country and abroad of the whole organisation of Brunner, Mond and Co.

From the report of the commission of experts which had been at the Lake for four months recently, they believed the amount of cash capital which the company would have available—namely, £250,000, less the amount incurred in preliminary expenses—would be found sufficient to carry on the business of the company to a larger extent than it had been carried on in the past. Two difficulties emerged from the report. One was the question of labour in East Africa, and the other the question of rolling stock on the railway.

As soon as certain important renewals and repairs now in hand were completed the directors believed that the output at the Lake could be maintained on a tonnage which would enable the interest on the debentures and the first and second preference shares to be paid at the expiration of two years from January 1 last, if not before that time.

Problems of the Paint and Rubber Industries

Paper Before Oil and Colour Chemists' Association

DR. H. HOULSTON MORGAN (president) was in the chair at the meeting of the Oil and Colour Chemists' Association on Thursday, April 23. In opening the meeting he recalled the fact that the Association was formed that day seven years previously.

Mr. B. D. PORRITT read a paper on "Some Problems of the Paint and Rubber Industries," in which he gave a review of the general position in the rubber industry, and called attention to some of the problems and difficulties affecting both the rubber industry and the paint industry.

As was well known, he said, rubber occurs in the *Hevea Braziliensis* in the form of an aqueous suspension known as latex, which contains from 30 to 40 per cent. of total solids. It had been claimed that by the use of suitable protective colloids latex might be concentrated to a cream or even a solid from which the original suspension might be regenerated merely by the addition of water. This, perhaps, might solve some of the problems incidental to the already appreciable export of latex, and as a result the time might come when latex powder, rather than rubber, would form the staple supply of the manufacturer.

Dealing with the preparation and composition of raw rubber the three general methods of coagulation, by the addition of a weak acid, coagulation by heat, and evaporation were mentioned, the bulk of the plantation product being obtained by the first method. During the last two years, however, a low temperature spray drying process had been introduced by E. Hopkinson which involved the evaporation of the whole of the latex. The process appeared to yield a rubber possessing very satisfactory characteristics which might, in the course of time, establish itself as a standard grade. Depending on the source of the latex and the method of preparation, variable amounts of resins, sugars, proteins, and salts were found in the commercial product. These rendered the product more resistant to oxidation, and played an important rôle in the vulcanisation process.

Caoutchouc

From the nature of the products formed on destructive distillation, and those obtained by treatment with ozone, it had been assumed that caoutchouc represented a highly polymerised form of isoprene, and the recent hydrogenation work of Staudinger, Pummerer and Koch appeared to support that view.

In both its chemical and physical behaviour, rubber showed a close resemblance to the drying oils, due no doubt to the presence of some analogous arrangement of the double bond in the structure of caoutchouc and linolic and linolenic acids. This fact was particularly obvious in connection with the changes which occurred during oxidation. In their behaviour towards oxygen, rubber and drying oils showed a remarkably close resemblance, the essential difference being that while the drying of oils was a property of supreme importance, the perishing of rubber was anything but a desirable technical characteristic. Caoutchouc and the unsaturated fatty acid alike reacted readily with ozone to form ozonides and peroxonides and the hydrolysis of these derivatives yielded, in the hands of Harries, important information regarding the constitution of both. The product formed by the combined action of bromine and chlorine on rubber was stated to exhibit considerable resistance to further chemical attack and had been put on the market as a varnish under the trade name of "Duroprene."

Vulcanisation of Rubber

Reference was then made to the vulcanisation of rubber. To Hayward belonged the credit of the first discovery of vulcanisation and, working more or less in conjunction with Hayward, whose patent he had acquired, Goodyear seemed to have directed his attention to examining the effect of various inorganic compounds, and in particular lead compounds. He exposed a sample of rubber containing both sulphur and white lead to the heat of a fire, and on examining the blackened material was surprised to find that it had become entirely altered in properties. Goodyear, however, was not the discoverer of vulcanisation nor did he recognise the fact that sulphur alone would effect the change, this latter being due to Thomas Hancock.

Mr. Porritt referred to the analogy existing between the vulcanisation of rubber and of the drying of oils. It was clear, he said, that the chemical changes taking place in the formation of linoxyn represented the outstanding features of the drying process, and though polymerisation changes occurred, the final product must be regarded as more akin to ebonite than to soft rubber in composition. In both cases, however, colloidal questions had to be taken into account and there was little doubt that the peculiar properties of vulcanised rubber were largely due to surface adsorption effects.

Referring to fillers it was stated that whilst it was early recognised that substances such as zinc oxide, whiting, and magnesium carbonate gave products with different physical characteristics it was not until recently that it had been appreciated that the toughening properties of fillers in rubber depended on surface effects and that, in general, fineness of division was associated with marked reinforcing properties. As a result, the determination of the particle size of fillers, particularly those of the type represented by carbon blacks and colloidal clays, had become a question of great interest in the rubber industry. It was certain that the complex problems of the compounding of rubber and the mixing of paints were closely related and that investigations carried out on the one would contribute to the knowledge of the other.

On the question of the ageing of rubber it was pointed out that the introduction of lamp-black gave a considerable degree of resistance to sunlight and colloidal lead sulphide behaved similarly, whilst by the use of red and yellow azo colours, soluble in the rubber, an even more marked protection was obtained. The development of a source of artificial light with properties equivalent to daylight, would go a long way towards solving the difficulties met in testing the durability of such varied products as rubber, textiles, dyes, pigments, paints, and varnishes.

Discussion

The PRESIDENT said that the advantage which the rubber industry had over the paint industry was that it possessed a research association. In the matter of fillers, too, the paint industry had its difficulties, and the shape and size of particles was an important factor. The reinforcement was not merely mechanical but there was some adsorption effect or something of that kind.

Mr. NOEL HEATON, referring to the perishing of rubber and paint, said that the rubber industry seemed to have done a great deal of work on the subject whereas the paint industry was only just beginning to tackle the problem. The paint industry had never yet attempted exactly to understand the conditions by control after the drying of the paint. He found it difficult to say how they could set about the control of the conditions in regard to the perishing of paint, but perhaps something might be gained from a study of what the rubber industry was doing. It was not sufficient merely to determine the particle size independently of anything else but it must be considered in relation to the dispersion in the actual medium. Here was a subject in which the two industries might help one another very much because there was a great similarity in the differences of the effects of particle size in rubber and paint.

Mr. PARISH said that the question of the determination of the size of particles was certainly a very difficult one. It was quite certain that in dealing with pigments it was necessary to use a different method of determining particle size according to the pigment being used and the size or size range of the particles in the pigment. Sedimentation methods had come very much to the fore in recent years and they seemed to provide possibly the best means for dealing with fillers.

Mr. GARVIE, speaking of a laboratory test to reproduce practical conditions to determine durability of a paint, referred to the marked changes as between night and day in temperature and humidity which it was so very difficult to reproduce in the laboratory because those changes were so numerous at different times during the 24 hours.

Mr. R. L. P. BRITTEN said that when dealing with different

pigments of different size particles inter-facial tension between the pigment and the medium was a very big factor and it could not necessarily be assumed that there was any co-relation between the results obtained. The adsorption phenomena which occurred on the particle was a specific one; it was a function of the size of the particle and it was also a specific one depending on the nature of the material being used. If there were some ready method of determining inter-facial tension it would be helpful.

Mr. PORRITT briefly replied, and expressed the hope that a member of the Oil and Colour Chemists' Association would, in the near future, read a paper before the Institution of Rubber Industry.

"Pyropruf" Roofing: Interesting Tests

Results of Chemical Research

AT the L.C.C. Stores Depôt in Pimlico on Thursday, April 23, some picturesque and convincing tests were made with a new bitumen asphalt roofing, known as "Pyropruf," which the well-known firm of D. Anderson and Son, Ltd. have recently produced. A small brick building had been erected divided into three compartments with brick partitions. These at either end were roofed with tiles and slates; the centre section with "Pyropruf." The end compartments, filled with highly inflammable material, were first set alight, and the fire burnt so fiercely that presently both roofs fell in with a crash and flames shot up. Then the section roofed with "Pyropruf" was similarly fired, and though ultimately the flames forced their way through, its resistance was more prolonged and the destruction of the roof not so complete. The tests, which were witnessed by a large company, confirmed two points—(1) that the "Pyropruf" roof was not affected by the fierce fires on either side to which it was exposed externally; (2) that though it was partially destroyed by the fire beneath, it remained consistently inert and never itself ignited. The scorched fabric at the end merely resembled some carbonised brittle cake.

The Firm's Claims

At a luncheon subsequently given at the Hotel Cecil, Mr. L. C. Lutyens, managing director, made a short statement. The firm, he said, were desirous of giving 1,000 rolls of "Pyropruf," and laying the same free of charge on the roofs of any dwelling houses, spread widely over towns in England to stand as observation tests, subject to the discretion of the Minister of Health. The tests that day had shown that "Pyropruf" could not cause or spread a fire and will keep fire under control better than tiles or slates, or any such material. It was a snug roof to live under; it was dustproof, windproof, airtight and waterproof, and half the cost of tiles and slates. It required no annual upkeep, for only attrition from the atmospheric changes would wear it down, as was the case with tiles and slates. As to its construction it was purely and simply an asphalt roof, asphalt by construction and by analysis. Asphalt was composed of bitumen and siliceous compounds, such as sand and silica, the siliceous compounds being the larger content. They stabilised the bitumen, and prolonged its life by arresting the actinic ray, which was done by dispersing the atoms of bitumen. They rendered the roofing fireproof for the purposes for which it was intended by displacing the hydrogen content and replacing with nitrogenous compounds. When exposed to fire heat the nitrogenous compounds functioned and arrested the olefine acetylene gases of the bitumen. As the fire became more intense the siliceous compounds turned to glass and the bitumen being finely incorporated with same became practically encased in glass and could not burn. So long as "Pyropruf" remained waterproof so long would it remain fireproof. It has fallen to the lot of their chemist, Mr. Child, to discover the true method of stablising bitumen, and he deserved the greatest praise for what he had done.

Mr. F. E. Hamer (THE CHEMICAL AGE), in expressing the thanks of the guests to the company, said that the problem of economy was one of national importance in connection with housing, and the example of the firm in searching for material which reduced cost without sacrificing efficiency deserved recognition. One notable point in the test was that there was no crash when the flames penetrated the roof as in the case of tiles, and this in the case of a high building with several floors might mean a difference between total and only partial destruction. He believed that, wherever a clear need of something new and better was expressed, the research chemist would be able to meet it if given a fair chance, and the firm were to be congratulated on recognising the essential value of research work and seeking for industrial applications of the results.

There was a short discussion afterwards, in which questions were put and answered.

Society of Dyers and Colourists

Annual Meeting of Manchester Section

THE annual meeting of the Manchester Section of the Society of Dyers and Colourists was held on Friday, April 24, Mr. J. Huebner presiding. The annual report stated that there were 389 members of the section, of whom 283 were full members, 73 associates and 33 junior members. The comparative figures for the previous year were 282 full members, 59 associates, and 56 junior members. Seven ordinary general meetings had been held during the session and, in addition, two special meetings. There were six vacancies on the Committee which were to be filled by nominations by the committee itself.

Modern Water Softening

An ordinary meeting of the section was also held at which Dr. L. H. Harrison, B.A., M.Sc., read a paper on "Modern Water Softening and the Textile Industry." Dr. Harrison said that in recent years the development of water treatment practice had made rapid progress. Manufacturers were coming more and more to the opinion that water purification plants were a necessary adjunct to a works. Although so many Midland public supplies were soft and clean, there was no reason why local supplies, scientifically treated, should not be equally suitable for process work—thereby affording an economy in cost and conserving the public supplies as population and industry increase. Of the available sources, well waters were usually clear but hard, surface waters were often soft, corrosive, and coloured, while stream waters varied and were liable to turbidity and pollution.

For simple clarification the pressure sand filter was the most convenient plant. It might be used direct or after the addition of a coagulating reagent; and its efficiency, as in all cases where sand was used, depended upon the formation of a gelatinous layer of finely divided matter on the surface of the sand. In the more difficult cases of coloured and turbid waters a pre-treatment was necessary with alumini with or without lime or chalk, followed by adequate sedimentation and sand filtration either in pressure or gravity sand filters. In softening operations the types of plant fell under two main heads, the lime soda softener and the base-exchange softener.

Two Types of Plant

In the older type—the lime soda softener—known quantities of lime and soda were added by special gear to measured quantities of water, and thorough mixing was provided for, followed by sedimentation and final filtration. The sedimentation tanks might be rectangular or cylindrical, the process hot or cold, and the final filtration through wood, wool, or preferably through sand. The essentials for success were accurate dosing, good mixing, and adequate settling—minimum three hours. The difficulties with the plant were the need for skilled attention, the necessity for control of reagents, and the disposal of sludge.

The base-exchange softener did not present these disadvantages, although, with high hardness, they tended to be somewhat more expensive in capital and running costs. The plants consisted of mild steel cylinders containing beds of base-exchange materials. These materials took up the lime from hard water until they became exhausted, when it was only necessary to wash them with brine to revivify them completely, the lime being driven out as $CaCl_2$. The minerals were usually complex insoluble silicates. The earliest commercial body was made by Gans in Berlin and was named "Permutit." It was made by a fusion process; and this material, along with a similar constituted wet process material, was used for many years. They worked well but tended to disintegrate in weak acids, required a long period for revivification.

and were wasteful of salt. Later a natural body, mined in America, actually Glauconite artificially treated, came on the market. It had an exceedingly low capacity for exchange, but could be regenerated quickly and the cycle of operations might be carried out several times a day. The material was cheap, very stable, and required less salt by one-third than the old "Permutit," but was not always homogeneous, while the grains were very small and set up considerable back pressure. The latest material was "Doucil," a complex aluminium silicate higher in exchange than any previous mineral and perfectly stable. It was regenerated upwards in practice, and admitted of instantaneous regeneration. In practice the salt required was half that used with the older minerals. Wash water used was also a minimum, and multiple cycles of exhaustion and regeneration per day were possible.

The choice of plant depended naturally on local conditions. All were agreed, however, on the necessity for soft water in the textile industry. Hard water in process work formed slimy lime soaps in any process where soap was used, tending to form insoluble deposits with organic matter on the fibres, giving rise to irregular bleaching and dyeing and weighting, and impairing the finish of the goods.

Dr. E. Knecht, M.Sc.Tech., F.I.C., read a preliminary note on the use of commercial sodium nitrite in the production of diazo and nitroso compounds.

A Life of Robert Owen

"BIOGRAPHY . . . is the painting of portraits. Such portraits, always of a man, are sometimes also of a place and time; and since they are pictures, it is, I fear, impossible to paint them without a touch of art." Thus Mr. Philip Guedalla in the editor's preface to the life of Robert Owen by G. D. H. Cole.*

If art is to conceal art, Mr. Cole is an artist of a very high order. With an extremely facile pen and a command of style and language which make his pages very readable from the literary standpoint, he has succeeded, without apparent harshness, in converting Robert Owen, a man of outstanding individuality, into a peg on which to hang the case for Socialism and Communism of the approved modern school.

Robert Owen did four big things. First of all he made a fortune out of trade; next he founded a model factory much on the lines of the Cadbury and Rowntree establishments which we know to-day; then he was the chief of the pioneers of the great co-operative movement; and lastly and fourthly, he promoted several experiments in Socialism for all of which he paid himself and all of which failed completely and utterly.

A very interesting life of Owen might be written to show the contrast which his monumental works bring out so clearly between the good of individualism and the folly and waste of collectivism. Mr. Cole, however, adopts another method, true politician that he is; he finds virtue in failure and declines to learn from experience. Owen's successes are therefore passed over and accepted as of minor importance, while his failures are held up to us as glorious examples, to spur us on to emulate them.

It is surely something of a paradox that Robert Owen, who maintained himself from the age of ten "without ever applying to my parents for any additional aid," should be claimed as an apostle by the advocates of State maintenance for all.

Owen was endowed with the gifts that are common to most of those who make a success of business life, and these powers found their expression in the successful organisation of industrial enterprises as naturally as the electric current emanates from the dynamo or the storage battery.

In his strictures on the industrial revolution Mr. Cole is scarcely just, and fails to recognise that the evils which were contemporary with it were light in comparison with the evils which immediately preceded it, when infant slavery was far worse, and children were set to work by their parents as soon as they could crawl. Owen was an enlightened employer, though even then he did not stand alone in this capacity, as Mr. Cole admits. The fact that he used his money and his position to try to help those who worked for him and with him proves that, in addition to unusually competent powers of the head, he also had a great heart. Stirred by a strong desire to make the world a better place, he was in that respect probably ahead of his times. The betterment of the lot of the workers, both materially and physically, has, however, always exercised the minds of many who by virtue of gifts of organisation are in positions of control over their fellows.

Owen, in so far as he confined himself to the conduct of business and the arrangement of the conditions under which his people worked, was an unqualified success. It was when he began to interfere with the natural evolution of society and to make experiments in the government and control of social communities, that he met with the failure which is inevitably the lot of those who try to set in order the complexities of human life.

It is, however, for his failures that Mr. Cole would seem to claim him as the pioneer of modern Socialism, though one would have thought that his experiments in Communism and co-operative villages would have served as a warning of the inherent impossibilities of Socialism. Of co-operation Owen was certainly an apostle, and it is in this conception that his most lasting work was done. But it is difficult to believe that he would have countenanced the modern socialistic doctrines of State-encouraged inefficiency and maintenance as a reward for mere existence.

One imagines a more impartial observer reviewing the life of Robert Owen, watching with admiration his early struggles, his sturdy independence and the development of his exceptional powers; following him with interest, though with considerable trepidation, into his schemes for the formation and reformation of the world at large, and recording with sorrow, though without surprise, that he ends a fanatical visionary preaching a new moral order and finally becoming adsorbed in the attempts of mediums and spiritualists to rend the veil which divides this unhappy world from the infinite beyond.

Mr. Cole is to be congratulated on the courage which enables him to take Owen, who demonstrated within a single lifetime the futility of Socialism and left behind a perfect bit of capitalism in the shape of the Co-operative movement, as his outstanding success, and claim him in support of all that he so thoroughly disproved.

The book, although it is pure Socialist propaganda, should be read by all interested in industrial history.

* *Robert Owen*, by G. D. H. Cole. Ernest Benn, Ltd., 8, Bouverie Street, London, E.C.4. 15s.

Chemical Merchants' Voluntary Liquidation

A MEETING of the creditors of James C. Barr, Ltd., chemical merchants, Glasgow, was held recently at Glasgow. Mr. J. K. McAuslin, the liquidator in the voluntary liquidation of the company, submitted a statement of affairs which showed liabilities of £30,090 8s. The assets were estimated to realise £2,138 14s. 11d., from which had to be deducted £856 12s. for preferential claims, leaving net assets of £1,282 2s. 11d. Since 1920 the company had been losing money. During the war it did exceptionally well, but it had since been unsuccessful. Between 1920 and 1925 something like £17,000 had been lost. A good deal of difficulty had been experienced in connection with orders received from India.

A creditor inquired if there was any proposal to place before the meeting, and the liquidator answered that attempts had been made to obtain further capital, but without success, and it had therefore been decided to wind up the company. The creditors decided to confirm the voluntary liquidation of the company, with Mr. McAuslin as liquidator, together with a committee.

Production of Palm Oil

THE best means of securing improved and increased production in palm oil kernels in West Africa is the subject of a report, issued last week, of a committee, appointed in 1923 at the request of the Joint West African Committee of the Liverpool, London and Manchester Chambers of Commerce. The report states that the oil obtained by the native methods is from 8 to 10 per cent. of the weight of the fruit, whereas more than double can be obtained with efficient power-driven machinery. Collection and extraction at present are so laborious that the industry depends essentially on cheap native labour. Unless important improvements are promptly introduced there is grave danger of the British West Africa industry being seriously affected by the mill-equipped plantations in Sumatra and elsewhere. The committee recommend every possible assistance being given to private enterprise in the industry.

Interesting Paper on Air Heating

(From a Correspondent.)

A paper of very great interest, particularly to chemical engineers, was read a short time ago before the American Society of Mechanical Engineers, by Mr. C. W. E. Clarke, on the subject of air heating as applied to steam generation, which undoubtedly constitutes the most important contribution that has yet appeared on this interesting subject.

It is, of course, agreed that the general practice of suddenly admitting a huge volume of cold air (which, even under the most efficient average conditions, is 40–50 per cent. above the theoretical) at 60° F. into red-hot furnaces at about 2,500° F., is highly unscientific from various points of view. That is to say, it lowers the temperature in the bottom half of the furnaces and reduces the emission of radiant heat, whilst at the same time subjecting the furnaces and the boiler itself to considerable strain on account of expansion and contraction. Further, also, the principle of heating the incoming cold air by the outgoing hot gases is highly efficient from the point of view of reducing the escape of waste heat. It will be admitted that the furnaces of steam generation plant, especially large power stations, are probably the most efficiently controlled of all methods of burning large quantities of coal, and it is very remarkable, therefore, that the possibilities of air heating have only been realised this last year or two. Thus, for example, even in the United States, it was not until Mr. Clarke installed the "Usco" air-heater at Colfax in 1923, and carried out the tests forming the basis of his paper, that a single power station was operating with air heating.

We are certainly a little better than this in Great Britain, and since the introduction of the "Usco" air heater in 1911 by The Underfeed Stoker Co., Ltd., of London, for example, a few power stations have adopted the principle, but the general development over here—and the same applies to France—has been very disappointing. This is partly due to the inefficient designs that have been placed on the market from time to time, giving rise to considerable trouble as regards corrosion, leakage, and difficulties in the way of cleaning, but the chief reason is the lack of data, such as Mr. Clarke has now supplied, giving authentic figures.

The principle of the recuperator and the heating of the incoming cold air by the outgoing hot gases has, of course, been a long-established practice in the gas industry, but generally speaking, with many types of furnace—and this applies with particular force to the chemical industry—this highly efficient principle has not yet been adopted.

Boiler Plant Practice To-day

As regards boiler plant practice to-day, the latest methods in connection with mechanical stoking consist in the installation of superheater, economiser, and air heater, so as to heat respectively—by means of the exit gases—the steam, feed-water, and air for combustion. The performance figures of a boiler plant on these lines correspond approximately to 65·5 per cent. of the total heat in the coal absorbed by the boiler, 10·5 per cent. by the superheater, 7 per cent. by the economiser, and 4 per cent. by the air heater, the final exit gases being discharged to the chimney at only about 235° F. This is very different from the ordinary boiler plant where the over-all efficiency on land is less than 60 per cent., and probably does not attain 55 per cent. in the case of marine practice.

The tests carried out by Mr. Clarke at Colfax were on one very large water-tube boiler with a normal evaporation of 79,000 lbs. from and at 212° F. per hour, and an overload of 144,000 lbs., the air for combustion being raised in temperature from 60° F. to 235° F. A long series of the most elaborate 24-hour tests, with and without air heating, are described in the paper, but the nett results can be expressed by stating that air heating has increased the efficiency 5 per cent., that is a reduction of 7½ per cent. in the coal bill. Thus, the CO_2 is raised by an amount varying from 0·7 per cent. to 1·4 per cent., depending on the rating, whilst the amount of unburned material in the ash is reduced by 6–12 per cent., and at the same time the exit flue gas temperature from the boiler and economiser is lowered by 10–15° F., in spite of the fact that hot air at 235° F. is admitted to the furnaces in place of the usual cold air. Further, it is proved that the power consumed by the air heater, that is the fan for circulating the air, is approximately 0·4 per cent. of the steam generated by the plant.

The nett results are so highly satisfactory, that it is stated over £200,000 worth of orders for air heaters have already been placed in the United States since the reading of the paper in December, 1923.

The "Usco" air heater is of the multiple plate type, consisting essentially of a closed box divided vertically by means of a large number of metal plates, all the joints being electrically welded, so that no leakage can take place. The air and the gases are, therefore, split up into long and extremely narrow segments, the cold air flowing in one direction through each alternate channel, whilst the hot gases flow in the other alternate channels in the reverse direction on the contra-flow principle. In the past there is no question that the main trouble with air heating has been leakage. If air leaks into the flue gases it means, of course, a cooling of the plant and an increase in the power taken by the mechanical draught, whilst, if the flue gases leak into the air the oxygen content of the latter is reduced, also the efficiency of the combustion.

The Budget

Principal Features and Changes

The principal features of the Budget introduced by Mr. Churchill on Tuesday are :—

Reduction of 6d. in standard rate of income-tax to 4s.

Increase of relief for earned income from one-tenth with maximum allowance of £200 to one-sixth with maximum allowance of £250.

"Investment" income of taxpayers 65 years old or more to be treated as earned income.

Reductions in super-tax, balanced by increases in death duties.

Widows' pensions and old age pensions with contributions of 4d. a week each from employer and workman and 2d. a week each from employer and workwoman.

McKenna duties to be restored on July 1.

Customs duties on natural and artificial silks, varying from 1s. 6d. to 7s. 9d. per lb.; preference rate five-sixths of full rate.

Excise duty on artificial silk yarn of 2s. 6d. per lb. and an annual licence duty of £1 on manufacturers thereof.

Preference on sugar restored to 4s. 3⅓d. for ten years.

Imperial preference includes the following items :—Sugar—Full rate, 11s. 8d. per cwt.; preference rate, 7s. 4⅔d. Glucose—solid, full rate, 7s. 5d. per cwt.; preference rate, 4s. 8½d. Saccharin—full rate, 3s. 9d. per oz.; preference rate, 2s. 4½d.

Last financial year, 1924-25, the revenue was £799,436,000 and the expenditure £795,777,000, giving a surplus, applied to debt redemption, of £3,659,000. For the new financial year the estimated figures are—Revenue £801,060,000, expenditure £799,400,000, and estimated surplus £1,660,000.

British Soap Exports

Lord Leverhulme, speaking at the annual meeting of Lever Brothers, Ltd., on Thursday, April 23, said that not only is the soap consumed in the United Kingdom lower in price and higher in quality than that of any other country, but as a natural result thereof the United Kingdom enjoys a larger export trade in soap to neutral markets of the world than that of the total exports of soap of any other three nations in the world added together. Thus in soap the United Kingdom holds her own in face of what is probably the keenest competed-for business of any manufactures. There has been no rise in the price of soap during 1924, notwithstanding the fact that raw materials of oils and tallows during 1924 had averaged over £3 per ton above the average of 1923. Our whaling activities in the North Atlantic, Eastern South Africa, Georgia, and South Shetlands continue to prosper, and the season 1924-5 is the most successful we have ever enjoyed, and creates a new record for quality of oil and by-products and tonnage, said Lord Leverhulme.

Our works costs of production figures continue their steady progress of efficiency, and reflect the greatest credit on our staff. The true co-partnership spirit is equally manifest in all our associated companies at home and overseas. The total number of co-partners now exceeds 18,000, and the nominal value of their holdings of co-partners' certificates exceeds £1,940,000.

Lever Brothers, Ltd., and a Swedish Company

Judgment Reserved in Financial Case

LEVER BROS., LTD., of Port Sunlight, appeared for fifteen days before Mr. Justice Russell, in the Chancery Division, as defendants in two actions brought by Swedish plaintiffs in connection with a contract for the taking over of the shares in a Swedish soap and perfume manufacturing company. His Lordship on Wednesday reserved his judgment. Sir John Simon, K.C., opened the case for the plaintiffs in the two actions which were tried together, and with him were Mr. Clauson, K.C., and Mr. Bischoff. Lever Bros. were represented by Mr. Maugham, K.C., Mr. Bennett, K.C., and Mr. Turner. The plaintiff in the first action, which occupied the greater part of the hearing, was Mr. Axel Wallenberg, Swedish Minister at Washington, and a shareholder in Barnangens Kemiska Fabrikers Aktiebolaget, whose shares formed the subject of the contract. He sued for damages for repudiation by Lever Bros. of the contract entered into by their Swedish representatives. The other action was by a Stockholm bank, called Malarebanken, which claimed against Lever Bros. upon a guarantee with respect to an indebtedness of Barnangens.

Sir John Simon said Lever Bros. were anxious to increase their holding in the Swedish market for the commodities they produced, and the course they adopted to this end was to take steps for the purchase of the existing manufacturing business of Barnangens, with a view to organising it under their powerful and energetic management, thus making Sweden one of their spheres of influence. After the repudiation of the contract, and it might well be because of that, the Swedish company went into liquidation in March, 1921, the contract having been entered into in October and November, 1920.

The Defence

The case for the defendants was that the contract was subject to Mr. Wallenberg handing over at least 48,000 of the Barnangen shares, and that he never was in a position to do so, and also that the contract was by the law of Sweden invalid, and could not legally be carried out. As to the bank's guarantee, Lever Bros. said it was conditional on the shares being handed over by Mr. Wallenberg.

Except Mr. Wallenberg, who came from America to attend the case, the chief witnesses were lawyers from Sweden, who were called to give their views as to the validity or invalidity of the contract.

His Lordship reserved judgment.

Toluol from Coal Gas: Chemist's Claim

THE Royal Commission on Awards to Inventors, Mr. Justice Tomlin presiding, on Monday heard the claim of Dr. W. B. Davidson for £1,000 and £500 expenses in respect of processes for the extraction of toluol from coal gas.

Mr. J. Whitehead, K.C., said that Dr. Davidson was a gas engineer, consulting chemist and chemical engineer, and formerly a chemist at the Royal Arsenal. Soon after the war started he was approached by the Royal Arsenal experimental staff with a view to increasing the supply of toluol. He propounded a scheme of washing gas with heavy oil. This scheme was launched by the late Lord Moulton in January, 1915, in twelve of the largest gasworks, the plant at Nechells Gas Works, Birmingham, where Dr. Davidson was gas engineer, being the first to start and determine the best working conditions. These various plants were kept going to the end of the war. Vast quantities of toluol were raised by the process.

The point taken by the Crown was that the subject of the claim was not an invention, but the adaptation of known processes to meet the needs imposed by the war.

The hearing was adjourned until Monday, May 4.

Market for Fertilisers in Esthonia

THERE would appear to be an expanding market for fertilisers and feeding stuffs in Esthonia. Figures for 1924 show that imports of fertilisers amounted to 20,986 tons, valued at 131,450,990 E.marks, as against 16,573 tons in the previous year. This amount was chiefly made up of superphosphates 14,639 tons (84,124,530 E.marks), K_2O salt 3,545 tons (24,817,400 E.marks).

Relation of Chemistry to Agriculture

Birmingham University Lectures Concluded

THE last of the series of eight public lectures on "Chemistry in its Relation to Agriculture," by Mr. E. Holmes, was given in the Chemistry Department of the University of Birmingham on Wednesday. The subject of the lecture was photosynthesis, or the building up of plant material, in the leaves, from water and the carbon dioxide of the atmosphere, by the aid of sunlight. It was shown that two series of reactions were involved in the life history of the plant; the upgrade processes, concerned with the formation of sugars, starches, celluloses, proteins, and enzymes, and the downgrade processes responsible for the formation of fats, waxes, acids, amino-acids, terpenes, purines, alkaloids, essential oils, and colouring matters. When the downgrade processes got the upper hand the plant grew old and was finally killed. In this second stage the plant lost energy instead of gaining it. Photosynthesis was concerned with the formation of carbohydrates and proteins from carbon dioxide, water and simple nitrogenous compounds, by the upgrade processes. The chemist in the laboratory had available for his work extremes of temperature and pressure, and violent reagents, none of which could be conceived as possible in the case of the plant, the latter being, therefore, much more limited in its reactions. The types of reaction involved included condensation, polymerisation, hydrolysis, hydration, dehydration, oxidation, reduction, addition, substitution, and intramolecular change, all of which can take place at ordinary temperatures. These reactions were greatly facilitated by the plant's powers of synthesising enzymes, or organic catalysts.

Products and Photosynthesis

The primary products of photosynthesis, Mr. Holmes pointed out, still occasioned much controversy. In 1870, Baeyer suggested that formaldehyde was the first compound produced photolytically from carbon dioxide and water, since this was the only likely compound which satisfied the first condition, found by direct experiment, namely, that in its formation, in the leaf, the volume of carbon dioxide taken up should be equal to that of the oxygen given out. It was now generally accepted that the carbon dioxide was first involved in a complex with already existing plant products, probably the chlorophyll or green colouring matter, but whether free formaldehyde was then split out by the light energy and subsequently polymerised to carbohydrate, or whether it underwent change and was ejected as the completed carbohydrate, was matter for conjecture. Baly and his co-workers agreed with Willstätter that free formaldehyde was produced, but was polymerised almost immediately. Moore and Webster, on the other hand, agreed with the chlorophyll complex, but they pointed out that formaldehyde, if present in the free state, even transitorily, would combine with the proteins present, and so the formation of carbohydrates would be hindered. They, therefore, suggested that the complex underwent internal change, and that completed carbohydrate molecules were split off only when over-elaboration had produced an unstable system. This view was also upheld by Maquenne. The work of Baly, Heilbron, and Barker was then outlined together with the more recent criticisms of some of their conclusions. Several workers had failed to repeat the preparation and polymerisation of activated formaldehyde, and others had taken exception to the use of so-called photocatalysts which might have contained traces of active polymerising agents.

This work had led to attempts being made to obtain economic crop increases by raising the percentage of carbon dioxide in the air about growing plants, particularly in glass houses. Recent results had shown that when the percentage was raised to 0·5 per cent., the maximum permissible, as compared with the normal amount of 0·03 per cent., yields of tomatoes had been increased two and three-quarter times, and in the case of cucumbers one and three quarter times.

The lecturer pointed out that conditions of climate and soil did not necessarily control what crops should be grown. Agriculture was practised for profit, and the farmer did not plant what grew best, but what paid best. In conclusion, he quoted the dictum of Sir E. J. Russell to the effect that progress in agricultural chemistry was now mainly dependent on new methods and conceptions in pure chemistry.

From Week to Week

THE DUTY ON POTASSIUM CHLORATE has been increased from 1½ cents to 2¼ cents by President Coolidge.

AUSTRALIAN PUBLIC SCHOOL BOYS visited the works of Boots Pure Drug Co. at Nottingham and also Port Sunlight last week.

THE EXPLOSION OF A CYLINDER OF ACETYLENE, following a lorry fire, resulted in injuries to five persons at Birmingham on Tuesday.

BRITISH EXPORTS OF COKE to Switzerland during 1924 fell from 86,395 to 16,672 tons, while imports of coke from Germany were trebled.

LARGE STORES OF OIL CAKE and seed were destroyed by fire at Victoria Dock, Liverpool, on Sunday. The cause of the fire is unknown.

GERMAN PRODUCERS OF CHLORIDE OF MAGNESIUM are reported to be pressing for all firms to join their association in order to stop price cutting.

AMERICA'S WOOD-DISTILLATION INDUSTRY is stated to be severely threatened by the increased production of synthetic methanol from water gas at very low costs.

MR. R. L. WILSON, who has occupied the position of commercial manager with the firm of J. Brown and Co., manufacturing chemists, Dewsbury, for a number of years, has been appointed a director of the company.

MR. A. H. PRESTON, managing director of Colton, Palmer, Preston and Co., of Adelaide, is now in London, and wishes to get into touch with oil and colour manufacturers. He can be addressed at 61, Ludgate Hill, London, E.C.4.

OXFORD UNIVERSITY NEWS includes the announcement of the following awards of the Goldsmiths' Company's Exhibitions for Chemistry and Physics:—R. P. Bell (Balliol), H. R. Calvert (St. John's), and A. E. J. Pettet (Queen's).

EXPORTS OF RAW AND WHITE SUGAR from Poland this year amounted to 103,111 metric tons and 81,147 metric tons respectively up to April 1. The bulk of this sugar came to the United Kingdom, the Netherlands, Danzig, Germany, and the Soviet Union.

DYE IMPORTS into the United States during March totalled 527,964 pounds, valued at $488,501. This represents a considerable increase over the preceding month. Of these imports Germany contributed 49 per cent., Switzerland 39 per cent., Italy 5 per cent., and the remainder from Canada, Britain, Belgium and France.

NEW YORK IMPORTERS OF OLIVE OIL have filed a petition with the Tariff Commission for higher tariff on olive oil, owing to the practice in Italy of mixing, blending, and re-packing olive oil originating in Spain, Tunis and other countries and shipping it to the United States labelled as "Italian" olive oil. An increase of 50 cents in the present duties on the oil is proposed.

AN AGREEMENT is reported to have been concluded between Vickers, Ltd., and the Soviet Government for the erection of an oil cracking factory at Baku for converting mazout, thick oil in its natural state, into benzene by a thermal process. While a certain amount of oil refining has already been carried out at Baku, it is believed that this is the first time that a factory for oil cracking has been set up there.

THE JOINT INDUSTRIAL COUNCIL FOR THE GAS INDUSTRY met on Tuesday and discussed the wages deadlock which threatens to break up the Council. Both sides met separately at the outset, Mr. D. Milne Watson presiding over the employers' section and Mr. Will Thorne, M.P., over the trade union side. The full Council afterwards held a joint meeting. A discussion followed on the men's demands and employers' counter-proposals, but no decision was reached.

AN ALTERNATIVE FOR PETROL is promised for the near future by the British Power Alcohol Association, who state that if the industry is assisted, Great Britain will be in a position to produce 40 per cent. of her present motor fuel requirements. It is proposed to start six factories, each with a capacity of manufacturing 2,000,000 gallons of power alcohol per year. During the war Germany ran most of her motor transport and aeroplanes on alcohol fuel made to a large extent from sugar beet.

THE WELL KNOWN FIRM of J. G. Jackson, Ltd. (late of Coustonholm Works, Glasgow), specialists in filling and weighing machines, has been reconstructed and is now trading under the name of J. G. Jackson and Co., at Baltic Chambers, 50, Wellington Street, Glasgow, C.2. Mr. J. G. Jackson is still connected with the new company, which is operating all the Jackson patents as supplied to the British, Australian, French, Belgian, and Italian Governments and include many of the most modern filling and weighing machines for commercial purposes on the market.

MR. A. L. HALL, M.A., of Caius College, Cambridge, has been approved of for the degree of Doctor of Science.

THE QUESTION OF SAFEGUARDING THE GAS MANTLE INDUSTRY is to be considered by a newly appointed committee.

SIR HUMPHRY DAVY ROLLESTON, Regius Professor of Physics, at Cambridge, has been elected a Fellow of St. John's College.

AN AMALGAMATION of the Textile Institute with the Bankers' Institute was advocated at a meeting of the former on Wednesday.

THE CHEMISTS' EXHIBITION will be held at Holland Park Hall, London, W., from Monday to Friday next week, from 11 a.m. to 8 p.m. each day.

MR. D. MILNE WATSON of the Gas Light and Coke Co. has been appointed a member of an industrial court for arbitration work in connection with the Civil Service.

THE DEATH HAS OCCURRED of Mr. Frank Dodd (57), foreman of the gas producer plant at the Winnington Chemical Works of Brunner, Mond and Co., Ltd. He had been thirty-seven years with the firm.

MR. JOHN W. M'LUSKY, Glasgow Corporation gas manager, sailed from Liverpool on Thursday, April 23, for the United States, where he will inquire into the latest American practice in coal carbonsation. He will be away for two months.

SIR THOMAS EDWARD THORPE, of Whinfield, Salcombe, Devon, a former President of the British Association, of the Chemical Society, and of the Society of Chemical Industry, left estate of the gross value of £18,170, with net personalty £15,068.

"OXY-ACETYLENE TIPS" is the title of an enterprising house organ of the Linde Air Products Co. It is excellently produced and is devoted to illustrating the practical application of Linde products in numerous industries. Every article is illustrated.

AN EXPORT PREMIUM ON SUGAR BEET is to be made by the Latvian Government. They will pay exporters on every kilog. of beetroot exported during the three years 1924-26, a premium of 13 per cent. of the import duty on one kilog. of fine sugar at the date of export.

COLONEL LANE FOX, in the House of Commons on Tuesday, stated, in reply to a question, that the scientific treatment of coal on a commercial scale to eliminate the smoke nuisance was being examined by the Mines Department in conjunction with the Department of Scientific and Industrial Research. He said that he would endeavour to expedite the matter.

A SPECIAL MEETING of the Joint Dyers' Executive was held in Bradford during the week-end, to consider the effect upon employment of the working hours in the trade being more than 48. It was decided to request the Allied Association of Bleachers, Dyers, Printers, and Finishers to agree to a variation of the existing agreements so as to eliminate all overtime working and ensure a strict observance of the 48 hours working week.

THE PETITION OF R. T. MATTHEWS for the compulsory winding-up of Clement and Johnson, Ltd., proprietors of Yadil, was again before the Companies Winding-up Court on Tuesday, when Mr. Jenkins, K.C., for the petitioning creditor, said the company was in the hands of the receiver for the debenture holders. He said the petition had been standing over as a scheme was proposed, but the scheme had fallen through. He did not now desire a winding-up order. The assets would realise something over a shilling in the £. With the consent of all parties, he asked that the petition should be dismissed without costs. Mr. Cohen, for the company agreed, and Mr. Justice Eve accordingly dismissed the petition.

Obituary

MR. EDWARD G. PROULX, of Purdue University, State chemist and seed commissioner of Indiana.

MR. ALEXANDER REID, of Alexander Reid and Brother, Ltd. dyers, of Ladyburn Dye Works, Paisley. Mr. Reid was widely known in agricultural circles. He was 60.

MR. GEORGE W. DAVISON, vice-president of the Davison Chemical Co., Baltimore, aged 80. He was a prominent figure in the heavy chemical and fertiliser industry for over half a century.

MRS. BRUNNER, widow of Mr. Henry Brunner who in 1886 was elected a director of Brunner, Mond and Co., Ltd., and who died in 1916. Among the mourners at the funeral on Tuesday were Sir John Brunner, Mr. Roscoe Brunner, and other members of the family.

MR. FREDERICK DONALD BAIN, of Illogan, a leading figure in the Cornish mining industry. He was associated with several Malay mines controlled from Redruth and with mining companies, including the Cornwall Arsenic Co., Redruth Tin Smelting Co., and the Harford and Bristol Brass Co. He was 66.

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ANALYSIS.—On the absorption of carbon monoxide. Part II. Advantages of using hot reagent. T. C. Sutton and H. R. Ambler. *Analyst*, April, 1925, pp. 172–174.

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Anomalous adsorption of dyes by wool and cotton. J. B. Speakman and A. E. Battye. *Color Td. J.*, April, 1925, pp. 102-105.

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NITRO COMPOUNDS.—Some physical properties of nitro derivatives. L. Desvergnes. *Monit. Scient.*, April, 1925, pp. 73-78.

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HYPOSULPHITES.—The hyposulphite industry. Part II. E. Geay. *Rev. Chim. Ind.*, March, 1925, pp. 85-89.

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PEAT.—The composition of peat and the lignin theory. J. Marcusson. *Z. angew. Chem.*, April 16, 1925, pp. 339-341.

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NITRATION.—Nitration with nitrates. Part II. J. B. Menke. *Rec. Trav. Chim. Pays-Bas*, April 15, 1925, pp. 269-270.

Patent Literature

Abstracts of Complete Specifications

231,206. Dyes and Dyeing of Acetyl Silk. Scottish Dyes, Ltd., E. G. Beckett, J. Thomas and R. Tonkin, Murrell Hill Works, Carlisle. Application dates, September 14, 1923, and March 21, 1924.

The process is for producing a dyestuff comprising the nitration of a diphthalimido anthraquinone [Specification No. 214,765 (see The Chemical Age, Vol. X, p. 577)], followed by hydrolysis and treatment with an alkaline sulphide. This substance gives blue shades on acetyl silk. In an example, 1 : 5-diphthalimido anthraquinone is dissolved in 97 per cent. sulphuric acid, and is nitrated with a mixture of 80 per cent. nitric acid and 97 per cent. sulphuric acid, the temperature being kept at 25° C. The temperature is then raised to 30° C. for one hour, the mixture poured into water, filtered, and washed free from acid. This product is suspended in water and treated with a solution of sodium sulphide and caustic soda at 80° C. The mixture is then filtered hot, and washed. Details are also given of the method by which the hydrolysis and treatment with the alkaline sulphide are effected independently instead of simultaneously as above. Other examples are given in which a partial hydrolysis is effected, and in which the phthaloyl groups remaining in the partially hydrolysed product are removed. Particulars of the dyeing of cellulose acetate, especially " Celanese " silk, are given.

231,211. Oxalates and Other Organic Substances, Recovery of. H. Wade, London. From W. A. Fraymouth, and The Bhopal Trust, Ltd., Bhopal, Central India. Application date, October 25, 1923.

The process is for recovering substances, such as calcium oxalate, which occur in many natural substances such as the bark of terminalia arjuna, and in opuntia and other plants. The material is converted into an aqueous pulp, and it has been found that when this pulp is passed over the surface of crepe rubber the oxalate tends to adhere, while the fibrous or cellulosic material passes over the surface. Other suitable surfaces are the woollen blanket material employed for recovering suspended gold particles, and also the surface of rough sawn wood. The fibrous particles may be acted upon by alkalis such as sodium carbonate or hydrate, to facilitate the separation of the oxalate. It is also found that the selectivity of the surface may be increased by adding to the pulp a small proportion of sessamum oil.

231,218. Hydrogen or Hydrogen-Nitrogen Mixtures, Production of. J. Y. Johnson, London. From Badische Amilin and Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, November 26, 1923.

Hydrocarbons are converted into hydrogen or hydrogen-nitrogen mixtures by vaporising them and burning with sufficient oxygen to convert the carbon contents into carbon monoxide only. Thus, if methane is treated, the quantity of oxygen should be that given by the equation $2CH_4+O_2=2CO+4H_2$. The hydrocarbons are preferably heated before ignition, and the reaction is made more complete by the presence of refractory material containing iron or nickel, or their oxides. If air is employed instead of oxygen, hydrogen-nitrogen mixtures are obtained which may be used in the synthesis of ammonia. The gaseous mixture obtained is subjected to the action of steam in the presence of a catalyst such as finely divided iron oxide, in order to substitute hydrogen for carbon monoxide. The carbon dioxide formed is then removed.

In an example, 10 parts by volume of coke-oven gas containing 30 per cent. of methane are ignited with 3 parts of oxygen, and the products are passed over burnt magnesia containing a small proportion of nickel. The products having a temperature of 1200°–1300° C. are cooled to 600° C. by the injection of water, and sufficient steam is then added for the catalytic decomposition which converts the carbon monoxide into hydrogen. The hydrocarbon gases may be preheated by e waste heat of the combustion gases.

231,224. Chemical Reactions in Solutions, Process of Effecting. M. Brutzkus, 7, Rue de Versailles, Viroflay, France. Application date, December 17, 1923.

Chemical reactions in solution are the result of two oppositely directed reactions, and the velocity of the observed reaction depends on the difference in the velocities in the two inverse reactions. It may be deduced from theoretical considerations that the increase of the total osmotic pressure corresponding to the total concentration of all the dissolved substances favours a reaction which produces a decrease in the number of molecules, and retards a reaction which involves an increase. A decrease in the total osmotic pressure produces the opposite effect. An increase of the partial osmotic pressure of one of the substances, which corresponds to the concentration, accelerates a chemical reaction which involves the disappearance of the substance, and retards a reaction which liberate the substance. A reduction of the partial osmotic pressure produces the opposite effect. An increase in the temperature of the solution favours endothermic reactions against exothermic reactions, and a decrease in temperature produces the opposite effect.

It is therefore deduced that a chemical reaction in a solution may be assisted by varying the total osmotic pressure, the partial osmotic pressure of the constituents, and the temperature, in the opposite direction to the changes which the reaction produces. Thus if in a mixture of acetic acid, alcohol, and ethyl acetate dissolved in water, the total osmotic pressure is continuously increased, the partial pressure of the acid and alcohol continuously increased, and the temperature continuously reduced, the formation of the ester will proceed at a greatly increased rate. The external influences may be greater or less than those produced by the reaction itself and the effect will vary accordingly. In this invention, the osmotic pressures and the temperature are varied in accordance with the above principles.

In an example of the production of potassium sulphate from solutions of potassium chloride and magnesium sulphate, the container is provided with a perforated pipe through which a small amount of a highly concentrated solution of potassium chloride and magnesium sulphate can be introduced. A second pipe is provided for the passage of steam, and a third for the passage of cooling liquid. The container is charged to one-third of its volume with potassium chloride and magnesium sulphate solution, the former being in 50 per cent. excess. The solution is steam-heated to 50° C., and the strong solution in the same proportions is slowly introduced so that the container is filled in two hours. The temperature is regulated so that a continuous increase from 50°–70° C. takes place. The addition of the concentrated solution increases the partial osmotic pressure and facilitates the production of potassium sulphate. Another detailed example is given of the formation of ethyl acetate from acetic acid and alcohol. By a suitable regulation of the conditions the reaction may be effected in three hours. Details are also given of the inverse reaction involving the decomposition of acetate into acetic acid and alcohol.

231,285. Methyl Alcohol and Other Oxygenated Organic Compounds, Manufacture of. J. Y. Johnson, London. From Badische Anilin und Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, February 8, 1924.

In the synthetic production of methyl alcohol from mixtures of carbon monoxide and hydrogen in the presence of a catalyst, it has been found that the catalyst quickly deteriorates and methane, etc., are formed instead of alcohols. This is due to the formation of volatile compounds of iron, nickel, and cobalt, especially the carbonyls, or by the deposit of the metals from such carbonyls. In this invention the heated parts of the vessels are made of or lined with copper, silver, aluminium, or a steel containing a substantial proportion of chromium, manganese, tungsten, molybdenum, or vanadium. The cooler parts of the vessel may be formed of zinc, tin, lead, etc., or they may be enamelled. Aluminium is only suitable for use where the temperature is not above 550° C. The steel preferred is known as " steel V2A " and contains chromium 20 per cent., nickel 7 per cent., carbon 0·27 per cent., silicon 0·45 per cent., and manganese 0·35 per cent. The working of the catalytic process is otherwise unaltered.

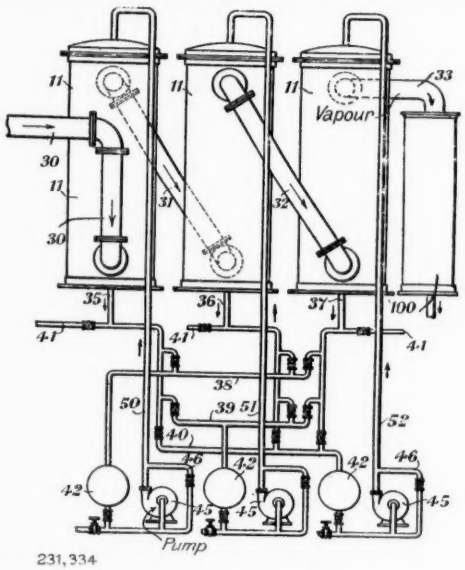
231,298. Carbonisation of Fuel. H. E. Smith, 87, Clarenden Road, Putney, London, S.W.15. Application date, February 28, 1924.

This process is for carbonising coal in a gas generator plant,

and is applicable for finely divided coal or caking coal. In its travel through the generator the coal is contained in spherical containers comprising two semi-spherical cases which can be drawn together by a hollow draw-bolt. The cases may be made from thin steel plate, iron castings, etc., and are perforated for the escape of gas. The expansion of the fuel during carbonisation is prevented, rendering the residue similar to briquetted fuel. The spherical containers are arranged to travel in a vertical, horizontal, circular, or spiral track round the heated fuel bed to carbonise the coal.

231,334. Fractional Distillation of Oils and Other Hydrocarbons. D. Pyzel, 3,401, Broadway, Oakland, Cal., U.S.A. Application date, April 22, 1924.

In this process the oil is vaporised and passed through a dephlegmator through which circulates a stream of cold



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liquid identical with the desired condensate. Vapour passes through a pipe 30 to the first of a series of dephlegmators 11, and then through pipes 31, 32 to successive dephlegmators, and finally through a pipe 33 to a condenser 100. The condensed vapours are drawn off through pipes 35, 36, 37, which by suitable valves can be connected to pipes 38, 39, 40. Each of the latter delivers the condensate to a cooler 42, from which it may be passed into a centrifugal pump 45 having a valved by-pass 46 to regulate the delivery. The condensate is delivered through pipes 50, 51, 52 to the corresponding dephlegmator, which is thus supplied with its own cooled condensate. The excess of condensate flowing out of the dephelgmator is drawn off through a pipe 41.

231,342. Aryloxy-Naphthylketones, Manufacture of. Soc. of Chemical Industry in Basle, G. de Montmollin, 127, Hebelstrasse, Basle, Switzerland, and G. Bonhôte, 6, Hasenberg, Basle, Switzerland. Application date, May 7, 1924. Addition to 203,824.

Specifications Nos. 203,824 and 212,569 (see The Chemical Age, Vol. IX., p. 431, and Vol. X., p. 522) describe processes for making aryloxy-naphthylketones by treating naphthols with aryl chloroforms. In this invention at least one molecular proportion of an aryl chloroform is treated with one molecular proportion of a naphthol or a sulphonic or carboxylic acid thereof in the presence of alkali or other acid-binding substances. In an example, a suspension of α-naphthol in sodium acetate solution is treated with phenyl chloroform in the presence of a small proportion of copper powder. The separated semi-solid product is extracted with hot dilute caustic soda lye, and the alkaline solution is mixed with dilute hydrochloric acid until a filtered sample is yellow. The filtrate is then acidified to precipitate the 1:1¹-phenylnaphthyl-4¹-oxyketone, which may afterwards be purified by recrystallising from benzene. Examples are also given of the production of 1:1¹-phenylnaphthyl-2¹-oxyketone from β-naphthol and phenylchloroform; 1-phenylketone-2-oxynaphthol-3-carboxylic acid from 2-oxynaphthalene-3-carboxylic acid and phenylchloroform; and 2-phenylketone-1-oxynaphthyl-4-sulphonic acid from the sodium salt of 1-oxynaphthalene-4-sulphonic acid and phenyl chloroform.

Note.—Abstracts of the following specifications which are now accepted appeared in The Chemical Age when they became open to inspection under the International Convention: 209,092 (Farbwerke vorm. Meister, Lucius und Brüning), relating to manufacture of vat dyestuffs, see Vol. X., p. 250; 214,629 (Soc. of Chemical Industry in Basle), relating to manufacture of dyestuffs capable of being chromed, see Vol. X., p. 681.

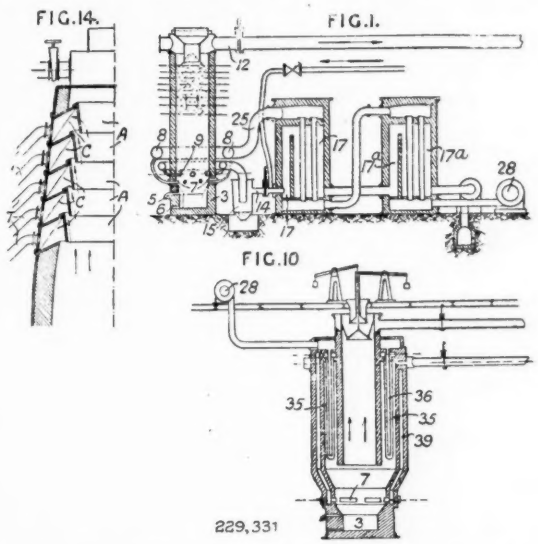
International Specifications not yet Accepted

229,330. Dyes. Farbenfabriken vorm. F. Bayer and Co., Leverkusen, near Cologne, Germany. International Convention date, February 13, 1924.

Diazo compounds are coupled with aryl-, aralkyl-, or alkyl-aryl-sulphaminonaphthol sulphonic acids, to obtain azo dyes. Diazo components include simple amines, aminoazo compounds, tetrazo compounds, or intermediate compounds from a tetrazo compound and one molecule of another component. The products give red to blue shades on wool. Examples are given in which diazotized-*o*-phenetidine is coupled with 1-ethyl-*p*-toluene-sulphamino-8-naphthol-3 : 6-disulphonic acid, and in which the aminoazo compound from aniline-2 : 5-disulphonic acid and 3-amino-4-cresolethyl-ether is diazotized and coupled with 2-methyl-salicyl-sulphamino-8-naphthol-6-sulphonic acid. The sulphonic acids referred to are obtained by condensing the corresponding alkylamino-naphtholsulphonic acids with *p*-toluene-sulphochloride or salicyl-sulphochloride.

229,331. Gasifying Solid Fuel, Treating Ores, and Smelting Metals. L. Chavanne, 18, Avenue du Président Wilson, Paris. International Convention date, February 13, 1924.

Solid fuel is continuously gasified in an ash-melting producer by means of air and/or oxygen blown in at the bottom. The lowest zone has a temperature of 1,750° C. to burn the carbon and form slag; the charge is fused in the middle zone; and the upper distillation zone has a temperature up to 1,500° C. and extends about half the total height. The temperature of distillation may be adjusted by withdrawing gas from the middle zone, or injecting steam or carbon dioxide. Tars and oils are drawn off fractionally from the upper zone. Lime,



limestone, or fluorspar may be added to form a slag and to remove sulphur from ores. Iron oxide in the charge is reduced to sulphur-free ferro-silicon. Compounds containing aluminium and silicon may be added to yield a slag from which an aluminous cement may be obtained. Low-grade ores or wastes containing zinc, copper, tin, lead, silver, potassium or sodium may be added, the metals being recovered from the gases or the slag.

The air blast is injected from an annular pipe 8 through tuyeres 7, and gas may be withdrawn through outlets 9 to a dust separator 15. The gas is then burned in heat exchangers 17, 17*a*, and air or oxygen is forced by a fan 28 through these heat exchangers to the producer. The producer gas and some distillates are drawn off by a pipe 12, while tar, tar oils, and light oils are fractionally removed through the annular spaces between cone-shaped sections A, and thence through pipes T. In a modified producer, the air blast is preheated in concentric tubes, 35, 36, and passages 39, and then injected through tuyeres 7. The slag is received in a container 3.

229,334. CHLORINE. Rhenania Verein Chemischer Fabriken Akt.-Ges., Cologne, Germany. International Convention date, February 15, 1924.

The gas mixture resulting from the Deacon process is dried by strong sulphuric acid, and treated with a dried adsorbent such as activated carbon to absorb the chlorine. The chlorine is then recovered by heating or exhaustion, the first 25 per cent. being impure, and the rest pure. The impure chlorine is treated again.

229,619. PURIFYING TARS AND OILS. A. Wohl, 113, Hauptstrasse, Langfuhr, Danzig, A. Goldschmidt, 24, Hauptstrasse, Langfuhr, Danzig, and A. Prill, 19, Birkenallee, Langfuhr, Danzig. International Convention date, February 19, 1924.

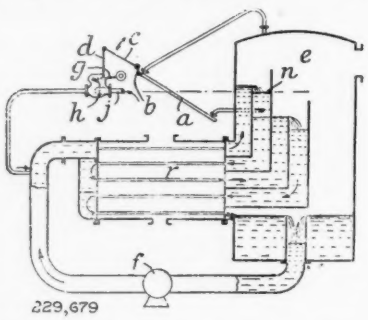
Resin oils, pine tars, and residues from turpentine oil purification are purified by extracting with petroleum ether, gasoline, ligroin, carbon disulphide, benzol, carbon tetrachloride or trichlorethylene. The solution is decanted off, and then distilled to remove the solvent.

229,623. SOLUBLE STARCH. Chemische Fabrik Pyrgos Ges., Radebeul, Dresden, and R. Haller, Grossenhain, Germany. International Convention date, February 21, 1924.

To render starch soluble, it is heated with water and a substituted chloramine such as the sodium compound of toluene-*p*-sulphochloramide till a clear solution is obtained.

229,678. ALKALI CELLULOSE AND VISCOSE. H. Hawlik, Chemische Textilwerke, Breslau, Germany, and O. Sindl, Mähr, Chrostau, Czecho-Slovakia. International Convention date, February 18, 1924.

In converting cellulose into alkali cellulose, it is treated with



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the waste lyes from a previous operation, and finally with fresh lye. Cellulose having a high hemi-cellulose content may thus be employed in the production of viscose, as the hemi-cellulose is more completely extracted.

LATEST NOTIFICATIONS.

232,549. Process for the treatment of raw materials containing highly refractory oxide. T. R. Haglund. April 17, 1924.

232,560. Process for drying calcium hypochlorite compounds. Chemische Fabrik Griesheim Elektron. April 15, 1924.

232,581. Manufacture of ferric oxide. Austral Pigments, Ltd. April 16, 1924.

232,599. Process for dyeing cellulose esters. Farbwerke vorm. Meister, Lucius and Brüning. April 15, 1924.

232,601. Process and apparatus for extracting oil, gelatingenous water, and solid material from animal and vegetable raw materials. K. Holter and S. Thune. April 16, 1924.

232,607. Process for producing nitrogen trichloride. Wallace and Tiernan Co., Inc. April 21, 1924.

232,610. Manufacture of oxide of zinc. A. Forgeur and L. Grange. April 16. 1924.

232,612. Process for the manufacture of organo-metallic compounds of sulpharsenol. F. Lehnhoff-Wyld. April 17, 1924.

232,618. Manufacture of pigments of zinc oxide combined with a metallic salt. P. Pipereaut and A. Helbronner. April 18, 1924.

232,620. Manufacture of dyestuffs. Society of Chemical Industry in Basle. April 20, 1924.

232,629. Manufacture of ortho-oxyazo-dyestuffs. Akt.-Ges. für Anilin-Fabrikation. April 19, 1924.

Specifications Accepted with Date of Application

208,151 and 209,767. Organic mercury compounds, Production of. A. Albert. December 5, 1922 and January 12, 1923. 208,151 addition to 206,507.

210,073. Bismuth compounds and method of making same. Haco-Co., Ltd., Berne. January 20, 1923.

211,841. Zinc, Treatment of complex ores containing. C. Clerc and A. Nihoul. February 24, 1923. Addition to 209,100.

217,235. Alkalised waste liquor from soda cellulose manufacture, Method of dry distillation of. E. L. Rinman. June 5, 1924.

220,609. Red lead, Process and apparatus for manufacturing. H. Hocking. August 16, 1923.

223,191. Distillation gases and the like, Process for the purification of. E. Urbain. October 13, 1923.

226,161. Tar distillation apparatus. Sulzer Frères Soc. Anon. Dec. 15, 1923.

230,063. Acetic anhydride, Manufacture of. Consortium für Electrochemische Industrie Ges. February 25, 1924.

231,921. Sulphuric acid, Manufacture of. W. J. Mellersh Jackson. (*G. F. Hurt Engineering Corporation.*) December 11, 1923.

231,944. Liquid hydrocarbons, Purification of. F. B. Thole and S. T. Card. January 11, 1924

231,945. Sodium perborate, Manufacture of. Deutsche Gold und Silber Scheideanstalt vorm. Roessler and O. Liebnecht. January 11, 1924.

231,935. Carbon from peat, lignite, sawdust, or other carbonaceous material for decolorising and deodorising and other processes, Method of obtaining. Artificial Coal Co. (Hamon Process), Ltd., and L. le W. Hamon. January 9, 1924.

Applications for Patents

Abrey, R. H., and Lanford, J. H. Production of oxalate of iron from blue asbestos. 10,186. April 20.

Akt.-Ges. für Anilin-Fabrikation. Manufacture of colourless compounds containing sulphur. 10,420. April 21. (Germany, April 24, 1924.)

Badische Anilin- and Soda-Fabrik, and Johnson, J. Y. Manufacture of alkyl esters. 10,474 and 10,622. April 22.

Benson, M. Dehydrating crude petroleum. 10,760. April 24.

Berk, F. W. Smelting furnaces. 10,340. April 21.

Blumenfeld, J., and Weizmann, C. Preparation of titanium compounds. 10,487. April 22.

Chemische Fabrik Griesheim-Elektron. Production of purifying materials for acetylene, etc. 10,674. April 24.

Coley, H. E. Manufacture of zinc. 10,185. April 20.

Coley, H. E. Manufacture of alloys. 10,561. April 23.

Coley, H. E. Apparatus for manufacture of gas. 10,562. April 23.

Coley, H. E. Production of hydrocarbons. 10,563. April 23.

Coley, H. E. Manufacture of metallic nitrides and ammonia from nitrogen. 10,564. April 23.

Coley, H. E. Manufacture of cyanides from nitrogen. 10,565. April 23.

Dupont, G. H. Purification of abietic acid, etc. 10,726. April 24.

Farbwerke vorm. Meister, Lucius and Brüning, Gärtner, H., Kranzlein, G., and Voss, A. Manufacture of tanning substances. 10,748. April 24.

Granton, L. E. Mixing, disintegrating, dissolving, or colloidizing mills. 10,257. April 20.

Hermann, A. Production of purifying materials for acetylene, etc. 10,674. April 24.

Joslin, O. T. Products produced from sulphonic acids and proteids. 10,672. April 24.

Kekwick, L. O. Production of hydrocarbons. 10,563. April 23.

Lanfry, M. P. Manufacture of artificial silk. 10,512. April 22.

Mathieson Alkali Works. Method of desulphurising iron. 10,495. April 22. (United States, April 23, 1924.)

Mautner, E. and Oppenheimer, R. Production of colouring matters on animal fibres, etc. 10,285. April 20.

Minerals Separation, Ltd. Extraction of platinoid metals from their ores. 10,611. April 24.

Richardson, G. Manufacture of barium sulphide. 10,294. April 20.

Simon Bros. (Engineers), Ltd., and Simon, L. J. Apparatus for extraction of oils, fats, etc. 10,255. April 20.

Society of Chemical Industry in Basle. Separation of potassium and sodium hydroxides. 10,746. April 24. (Switzerland, May 15, 1924.)

Soc. pour la Fabrication de la Soie Rhodiaseta. Manufacture of solutions of cellulose derivatives. 10,513. April 22. (France, January 20.)

Synthetic Ammonia and Nitrates, Ltd. Scrubbing gases. 10,199. April 20.

Ward, H. H. Production of carbon black for manufacture of rubber, etc. 10,193. April 20.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, May 1, 1925.

TRADE this week has been a shade better although the quiet tendency recently noted continues in evidence. Stocks continue extremely light and prices on the whole show little variation. Export demand has been a little better.

General Chemicals

ACETONE.—Inquiry and business have been better and the present quotation is round about £76 per ton, ex wharf.

ACID ACETIC continues quiet, technical 80% is quoted at £39 per ton and pure £41 per ton.

ACID CITRIC unchanged at 1s. 5d. per lb., and in poor request.

ACID FORMIC is very quiet and is quoted at round about £50 per ton for 85%.

ACID LACTIC is in good request and the market holds firm at £43 per ton for 50%.

ACID OXALIC is much steadier and price is well maintained at 3⅜d. per lb., with a firm demand.

ACID TARTARIC.—Demand continues disappointing and to-day's quotations are round about 11½d. to 1s. per lb.

ALUMINA SULPHATE.—Price is without change and business only fair

ARSENIC.—No further decline is reported and in some quarters it is thought that the market is about touching the bottom. Cornish is quoted at, nominally, £28 per ton.

BARIUM CHLORIDE is quite active and is quoted at £11 to £11 5s. per ton, ex wharf.

CREAM OF TARTAR continues active and is quoted at about £76 per ton.

EPSOM SALTS are unchanged and in good demand.

FORMALDEHYDE is again easier and in exceedingly poor request, the average price quoted is between £40 and £41 per ton.

LEAD ACETATE is firmer in sympathy with the metal and white is quoted at about £45 to £46 per ton with brown at £43 per ton.

LIME ACETATE.—The market is as stagnant as ever, and makers continue firm in their price idea at £15 10s. for grey and £10 15s. for brown.

METHYL ALCOHOL is again lower with little business passing, the market nominally £45 to £46 per ton.

POTASSIUM CHLORATE.—This material is becoming exceedingly scarce owing to very heavy purchases by foreign buyers. The present quotation is 4d. per lb. and is likely to go higher.

POTASSIUM PRUSSIATE has been in fair request and price is well maintained at 7½d. per lb.

SODIUM ACETATE is very quiet and supplies can be obtained at round about £20 10s. per ton.

SODIUM BICHROMATE.—Slight reductions are reported for some export markets by British makers. Home price without change and demand is fair.

SODIUM HYPOSULPHITE is only a poor market and without change in value.

SODIUM PRUSSIATE has been in better request especially on export account and is quoted at 4¼d. per lb.

SODIUM NITRITE is in very good demand and is quoted at £22 to £23 per ton, ex wharf.

SODIUM SULPHIDE continues weak under the influence of continental competition.

ZINC SULPHATE is fairly active at £13 per ton, with a fair business to report.

Coal Tar Products

The market in Coal Tar Products is quiet generally.

BENZOL 90% remains unchanged at about 1s. 9d. to 1s. 9½d. per gallon on rails.

PURE BENZOL is quoted at 1s. 11d. to 2s. per gallon on rails.

CREOSOTE OIL is unchanged, at 6d. to 6¼d. per gallon on rails in the North, while the price in London is quoted at 7d. to 7¼d. per gallon.

CRESYLIC ACID has no great inquiry, and is quoted at 1s. 9d. per gallon on rails in bulk for the pale quality 97/99%, while the dark quality 95/97% is quoted at 1s. 7d. to 1s. 8d. per gallon.

SOLVENT NAPHTHA is steady at about 1s. 3½d. per gallon on rails.

HEAVY NAPHTHA is also unchanged, at about 1s. 1d. to 1s. 2d. per gallon on rails.

NAPTHALENES remain stationary at about £3 15s. to £4 5s. per ton for the lower qualities, while 74/76° quality is quoted at £5 to £5 10s. per ton, and 76/78° at £6 to £6 10s. per ton.

PITCH remains dull, prices are unchanged. To-day's values are approximately 40s. to 42s. 6d. f.o.b. main U.K. ports.

Latest Oil Prices

LONDON.—LINSEED OIL steady at 5s. to 2s. 6d. advance; spot, £44 15s.; May, £43 17s. 6d.; May-August, £44; September-December, £43 10s. RAPE OIL steady and quiet. Crude, crushed, spot, £49; technical, refined, £52. COTTON OIL slow. Refined, common, edible, £47; Egyptian, crude, £42; deodorized, £49. TURPENTINE firm and held fully 6d. per cwt. higher. American, spot, 69s., sellers, after 68s. 9d. had been paid; and May, 68s. 6d., sellers.

HULL.—LINSEED OIL, naked, spot, £43 15s.; April, £43 12s. 6d.; May-August, £43 15s.; September-December, £43 5s. COTTON OIL, naked Bombay crude, £38 10s.; Egyptian crude, £40; edible refined, £44 10s.; deodorized, £46 10s.; technical, £41 10s. PALM KERNEL OIL, crushed, naked, £41 10s. GROUNDNUT OIL, crushed-extracted, £47; deodorized, £51. SOYA OIL, extracted, crushed, £40 10s.; deodorized, £48. RAPE OIL, extracted, £48 per ton, net cash, ex mill. CASTOR OIL and COD OIL unaltered.

Nitrogen Products Market

Export.—During the last fortnight the demand for sulphate of ammonia has been comparatively small, and practically the whole British production is being delivered for home consumption. The small surplus available has been sold at about £13 10s. per ton, f.o.b., and the bulk of this has been for Continental consumption. There has been more interest in the forward position, and the price for June onwards is about £12 15s. per ton, f.o.b.

Home.—The home consumption continues unabated, and producers are disposing of 500/600 tons per day. The demand is still regular from all parts of the country as well as from Ireland. The home price of £14 14s. per ton delivered to consumers' nearest station for neutral quality basis 21·1 per cent. nitrogen will remain unchanged until the end of May.

Nitrate of Soda.—The nitrate market continues weak, and cargoes for prompt arrival can be purchased at about £11 11s., c.i.f. The consumption is going ahead satisfactorily in the United States, but it is unlikely that the stocks in Europe will be consumed this season. It is generally anticipated that the nitrate scale for the coming fertiliser year will be considerably lower and that as a consequence the price of nitrate will show no upward movement in the intervening period.

American Market Movements

(From *Drug and Chemical Markets.*)

DEMAND for industrial chemicals is at low point of year. Prices fairly well sustained. Potassium chlorate not available on spot or for nearby shipment. Acetone strong.

Intermediates remain dull with prices likely to be slashed for real large orders. Benzene stronger owing to good demand. Other light oils continue sold ahead.

Fine chemicals showed very little activity with buyers wary of laying in any supplies. Bromides higher for shipment from Germany. Camphor and menthol quiet. Quicksilver firm on spot.

Vegetable oils register practically no improvement and demand remains at standstill. Linseed oil higher. Animal oils in fair routine demand. Fish oils are quiet but prices are firm.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at retailers' works.

General Heavy Chemicals

Acid Acetic, 40% Tech.—£21 to £23 per ton.
Acid Boric, Commercial.—Prices reduced by £5 per ton. Crystal, £40 per ton, Powder, £42 per ton.
Acid Hydrochloric.—3s. 9d. to 6s. per carboy d/d., according to purity, strength and locality.
Acid Nitric, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.
Acid Sulphuric.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 65s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.
Bleaching Powder.—Spot, £10 10s. d/d; Contract, £10 d/d. 4 ton lots.
Bisulphite of Lime.—£7 10s. per ton, packages extra, returnable.
Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
Calcium Chlorate (Solid).—£5 12s. 6d. to £5 17s. 6d. per ton d/d, carriage paid.
Copper Sulphate.—£25 to £25 10s. per ton.
Methylated Spirit 64 O.P.—Industrial, 2s. 7d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.
Nickel Sulphate.—£38 per ton d/d. Normal business.
Nickel Ammonia Sulphate.—£38 per ton d/d. Normal business.
Potash Caustic.—£30 to £33 per ton.
Potassium Bichromate.—5d. per lb.
Potassium Chlorate.—2¾d. to 3d. per lb.
Salammoniac.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton. Carr. pd.
Salt Cake.—£3 15s. to £4 per ton d/d. In bulk.
Soda Caustic, Solid.—Spot lots delivered, £15 12s. 6d. to £18 per ton, according to strength; 20s. less for contracts.
Soda Crystals.—£5 to £5 5s. per ton ex railway depots or ports.
Sodium Acetate 97/98%.—£24 per ton.
Sodium Bicarbonate.—£10 10s. per ton, carr. paid.
Sodium Bichromate.—4d. per lb.
Sodium Bisulphite Powder 60/62%.—£16 to £17 per ton, according to quantity, f.o.b., 1-cwt. iron drums included.
Sodium Chlorate.—2¾d. per lb.
Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton, ex Liverpool. Nominal.
Sodium Nitrite 100% basis.—£27 per ton d/d.
Sodium Sulphate (Glauber Salts).—£3 12s. 6d. per ton.
Sodium Sulphide conc. solid. 60/65.—About £15 per ton d/d. Contract £14 15s. Carr. pd.
Sodium Sulphide Crystals.—£9 5s. per ton d/d. Contract £9 2s. 6d. Carr. pd.
Sodium Sulphide, Pea Crystals.—£15 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

Acid Carbolic Crystals.—5d. per lb. Quiet demand. Crude 60's, 1s. 6d. per gall. Little demand.
Acid Cresylic 97/99.—1s. 8d. to 2s. per gall. Fair business. Pale, 95%, 1s. 6d. to 1s. 10d. per gall. Dark, 1s. 6d. to 1s. 9d. per gall. Little demand.
Anthracene Paste 40%.—3d. to 4d. per unit per cwt.—Nominal price. No business.
Anthracene Oil, Strained.—7d. to 8d. per gall. Unstrained, 6d. to 7d. per gall.
Benzol.—Crude 65's.—9d. to 11½d. per gall., ex works in tank wagons. Standard Motor, 1s. 4½d. to 1s. 6d. per gall., ex works in tank wagons. Pure, 1s. 9½d. to 1s. 11d. per gall., ex works in tank wagons.
Toluol.—90%, 1s. 7d. to 1s. 8d. per gall. More inquiry. Pure, 1s. 10d. to 2s. per gall. Steady demand.
Xylol Commercial.—2s. 3d. per gall. Pure, 3s. 3d. per gall.
Creosote.—Cresylic, 20/24%, 8d. to 8½d. per gall. Little demand. Middle Oil, Heavy, Standard specification, 6d. to 7d. per gall., according to quality and district. More inquiry.
Naphtha.—Crude, 8d. to 9d. per gall. Solvent 90/160, 1s. 4d. to 1s. 6d. per gall. Demand good. Solvent 90/190, 11½d. to 1s. 1d. per gall. Steady business.
Naphthalene Crude.—Cheaper in Yorkshire than in Lancashire. Drained Creosote Salts, £3 to £5 per ton. Demand falling off. Whizzed or hot pressed. £6 to £9 per ton.
Naphthalene.—Crystals and Flaked, £12 to £15 per ton, according to districts. Very quiet.
Pitch.—Medium soft, 37s. 6d. to 42s. 6d. per ton, according to district. More inquiry for next season. Few sellers.
Pyridine.—90/160, 19s. to 19s. 6d. per gall. Market more active. Fair demand. Heavy, 11s. 6d. to 12s. per gall. More inquiry.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Acetic Anhydride 95%.—1s. 7d. per lb.
Acid H.—3s. 9d. per lb. 100% basis d/d.
Acid Naphthionic.—2s. 2d. per lb. 100% basis d/d.
Acid Neville and Winther.—5s. 8d. per lb. 100% basis d/d.
Acid Salicylic, technical.—11½d. to 1s. per lb. Price reduced. Improved demand.
Acid Sulphanilic.—9d. per lb. 100% basis d/d.
Aluminium Chloride, anhydrous.—10d. per lb. d/d.
Aniline Oil.—7½d. per lb. naked at works.
Aniline Salts.—8d. per lb. naked at works.
Antimony Pentachloride.—1s. per lb. d/d.
Benzidine Base.—3s. 8d. per lb. 100% basis d/d.
Benzyl Chloride 95%.—1s. 1d. per lb.
p-Chlorphenol.—4s. 3d. per lb. d/d.
p-Chloraniline.—3s. per lb. 100% basis.
o-Cresol 29/31° C.—3d. per lb. Demand quiet.
m-Cresol 98/100%.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
p-Cresol 32/34° C.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
Dichloraniline.—2s. 3d. per lb.
Dichloraniline S. Acid.—2s. 3d. per lb. 100% basis.
p-Dichlorbenzol.—£85 per ton.
Diethylaniline.—4s. 3d. per lb. d/d., packages extra, returnable.
Dimethylaniline.—2s. 2d. per lb. d/d. Drums extra.
Dinitrobenzene.—9d. per lb. naked at works.
Dinitrochlorbenzol.—£84 10s. per ton d/d.
Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 1s. per lb. naked at works.
Diphenylaniline.—2s. 10d. per lb. d/d.
G. Salt.—2s. 2d. per lb. 100% basis d/d.
Monochlorbenzol.—£63 per ton.
a-Naphthol.—2s. 3d. per lb. d/d.
B-Naphthol.—1s. per lb. d/d.
a-Naphthylamine.—1s. 3½d. per lb. d/d.
B-Naphthylamine.—3s. 9d. per lb. d/d.
m-Nitraniline.—4s. 2d. per lb. d/d.
p-Nitraniline.—2s. 2d. per lb. d/d.
Nitrobenzene.—5½d. to 5½d. per lb. naked at works.
o-Nitrochlorbenzol.—2s. 3d. per lb. 100% basis d/d.
Nitronapthalene.—10d. per lb. d/d.
p-Nitrophenol.—1s. 9d. per lb. 100% basis d/d.
p-Nitro-*o*-amido-phenol.—4s. 6d. per lb. 100% basis.
m-Phenylene Diamine.—4s. per lb. d/d.
p-Phenylene Diamine.—9d. 9d. per lb. 100% basis d/d.
R. Salt.—2s. 4d. per lb. 100% basis d/d.
Sodium Naphthionate.—2s. 2d. per lb. 100% basis d/d.
o-Toluidine.—10d. per lb.
p-Toluidine.—2s. 3d. per lb. naked at works.
m-Toluylene Diamine.—4s. per lb. d/d.

Wood Distillation Products

Acetate of Lime.—Brown £11. Quiet market. Grey, £15 10s. per ton. Firmer. Liquor, 9d. per gall. 32° Tw.
Acetone.—£78 per ton.
Charcoal.—£7 5s. to £9 per ton, according to grade and locality Fair demand.
Iron Liquor.—1s. 7d. per gall 32° Tw. 1s. 2d. per gall. 24° Tw.
Red Liquor.—10d. to 1s. per gall. 14/15° Tw.
Wood Creosote.—2s. 9d. per gall. Unrefined.
Wood Naphtha, Miscible.—4s. 9d. per gall. Only moderate market. 60% O.P. Solvent, 5s. per gall. 40% O.P.
Wood Tar.—£4 to £5 per ton. Demand slack and stocks being held.
Brown Sugar of Lead.—£43 10s. per ton.

Rubber Chemicals

Antimony Sulphide.—Golden, 7½d. to 1s. 5d. per lb., according to quality. Crimson, 1s. 5d. to 1s. 7½d. per lb., according to quality.
Arsenic Sulphide, Yellow.—2s. per lb.
Cadmium Sulphide.—4s. 4d. per lb., according to quantity.
Carbon Bisulphide.—£32 to £35 per ton, according to quantity.
Carbon Black.—6d. to 6½d. per lb., ex wharf.
Carbon Tetrachloride.—£62 to £67 per ton, according to quantity, drums extra.
Chromium Oxide, Green.—1s. 4d. per lb.
Indiarubber Substitutes, White and Dark.—5¾d. to 7½d. per lb.
Lamp Black.—£48 per ton, barrels free.
Lead Hyposulphite.—9d. per lb.
Lithopone, 30%.—£22 10s. per ton.
Mineral Rubber "Rubpron."—£16 to £18 per ton f.o.r. London.
Sulphur.—£10 to £12 per ton, according to quality.
Sulphur Chloride.—4d. per lb., carboys extra.

Sulphur Precip. B.P.—£56 to £65 per ton.
Thiocarbanilide.—2s. 6d. per lb.
Vermilion, Pale or Deep.—5s. 6d. per lb. Dearer.
Zinc Sulphide.—1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

Acid, Acetic 80% B.P.—£41 per ton ex wharf London in glass containers.
Acid, Acetyl Salicylic.—2s. 9d. to 3s. per lb., according to quantity. Market slightly easier.
Acid, Benzoic B.P.—2s. to 2s. 3d. per lb., according to quantity.
Acid, Boric B.P.—Prices reduced by £5 per ton. Crystal £46 per ton, Powder £50 per ton. Carriage paid any station in Great Britain.
Acid, Camphoric.—19s. to 21s. per lb.
Acid, Citric.—1s. 4½d. per lb., less 5% for ton lots. Slightly upward tendency.
Acid, Gallic.—2s. 9d. per lb. for pure crystal, in cwt. lots. Easier.
Acid, Pyrogallic, Crystals.—6s. per lb. for 1 cwt. lots. 7s. 6d. per lb. for 7-lb. lots, according to quantity. Steady market.
Acid, Salicylic.—1s. 5d. to 1s. 6d. per lb., according to quantity. Market rather easier.
Acid, Tannic B.P.—2s. 9d. per lb. Quiet steady demand.
Acid, Tartaric.—1s 1d. per lb., less 5%. Very firm. Demand good.
Amidol.—9s. per lb., d/d.
Acetanilide.—1s. 9d. per lb. Price lower owing to competition.
Amidopyrin.—14s. per lb.
Ammonium Benzoate.—3s. to 3s. 6d. per lb., according to quantity.
Ammonium Carbonate B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks.
Atropine Sulphate.—12s. 6d. per oz. for English make.
Barbitone.—11s. 9d. per lb. Price lower owing to competition.
Benzonaphthol.—4s. 3d. per lb. spot. Weaker. Demand quiet.
Bismuth Salts.—Prices reduced by about 1s. 3d. to 2s. 3d. per lb. on account of the fall in the price of the metal.
Bismuth Carbonate.—10s. 6d. to 12s. 6d. per lb.
Bismuth Citrate.—10s. 3d. to 12s. 3d. per lb.
Bismuth Salicylate.—9s. to 11s. per lb.
Bismuth Subnitrate.—8s. 8d. to 10s. 8d. per lb.
according to quantity.
The price of Bismuth Metal has been raised from 5s. to 7s. 6d. per lb. Bismuth Salts have been advanced accordingly.
Borax B.P.—Crystal £29, Powder £30 per ton. Carriage paid any station in Great Britain.
Bromides.—Potassium, 1s. 11d. to 2s. 1d. per lb.; sodium, 2s. to 2s. 2d. per lb.; ammonium, 2s. 4d. to 2s. 6d. per lb., all spot. Much firmer. Forward prices higher.
Calcium Lactate.—1s. 7d. to 1s. 9d., according to quantity. Fair demand and steady market.
Chloral Hydrate.—3s. 8d. per lb., duty paid.
Chloroform.—2s. 6d. per lb. for cwt. lots.
Creosote Carbonate.—6s. 9d. per lb. Little demand.
Formaldehyde.—£41 per ton, in barrels ex wharf.
Glycerophosphates.—Fair business passing. Calcium, soluble and citrate free, 7s. per lb.; iron, 8s. 9d. per lb.; magnesium, 9s. per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 60%, 2s. 6d. per lb.
Guaiacol Carbonate.—7s. 6d. per lb.
Hexamine.—2s. 7d. per lb. for cwt. lots.
Homatropine Hydrobromide.—25s. to 30s. per oz.
Hydrastine Hydrochloride.—English make offered at 120s. per oz.
Hydrogen Peroxide (12 vols.).—1s. 8d. per gallon f.o.r. makers' works, naked.
Hydroquinone.—4s. 3d. per lb. Nominal.
Hypophosphites.—Calcium, 3s. 6d. per lb., for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
Iron Ammonium Citrate B.P.—1s. 11d. to 2s. 3d. per lb.
Magnesium Carbonate.—Light Commercial, £36 per ton net. Light pure, £46 per ton.
Magnesium Oxide.—Light Commercial, £72 10s. per ton, less 2½%, price reduced; Heavy Commercial, £25 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.
Menthol.—A.B.R. recrystallised B.P., 44s. per lb.; April delivery. Synthetic 26s. to 35s. per lb., according to quality.
Mercurials.—Market flat. Mercury slightly firmer. Red oxide, 5s. 2d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 7d. to 3s. 9d. per lb.; white precipitate, 4s. 6d. to 4s. 8d. per lb.; Calomel, 3s. 10d. to 4s. per lb.
Methyl Salicylate.—1s. 5½d. per lb., for ton lots. Keen competition.
Methyl Sulphonal.—19s. 3d. per lb. Cheaper.
Metol.—11s. per lb. British make.
Morphone and Salts.—Reduced by 1s. to 1s. 3d. per oz.
Paraformaldehyde.—2s. 2d. for B.P. quality. Keen competition has brought prices down.
Paraldehyde.—1s. 2d. to 1s. 4½d. per lb., in free bottles and cases.
Phenacetin.—4s. 8d. per lb. in cwt. lots. Unsettled. Supplies exceed demand.
Phenazone.—6s. 3d. to 6s. 6d. per lb. Spot price lower than forward.
Phenolphthalein.—4s. 6d. to 5s. per lb. for cwt. lots.
Potassium Bitartrate 99/100% (Cream of Tratar).—83s. per cwt., less 2½% for ton lots.
Potassium Citrate.—1s. 10d. to 2s. 2d. per lb.
Potassium Ferricyanide.—1s. 9d. per lb. Quiet.
Potassium Iodide.—16s. 8d. to 17s. 5d. per lb., according to quantity. Steady market.
Potassium Metabisulphite.—7½d. per lb., 1-cwt. kegs included. f.o.r. London.
Potassium Permanganate.—B.P. crystals, 7½d. per lb., spot; commercial, 8d. to 8¼d. per lb., carriage paid. Slight reaction after recent advance.
Quinine Sulphate.—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Steady market.
Resorcin.—4s. 9d. per lb. In fair quantities. Supplies exceed demand.
Saccharin.—63s. per lb. in 50 lb. lots.
Salol.—3s. 6d. per lb., for cwt. lots. Slightly dearer.
Silver Proteinate.—12s. per lb. for satisfactory product light in colour.
Sodium Benzoate, B.P.—1s. 10d. to 2s. 2d. per lb. From natural benzoic acid. Supplies of good quality available.
Sodium Citrate, B.P.C., 1923.—1s. 11d. to 2s. 2d. per lb., according to quantity.
Sodium Hyposulphite, Photographic.—£14 to £15 per ton, according to quantity, d/d consignee's station in 1-cwt. kegs.
Sodium Metabisulphite Crystals.—37s. 6d. to 60s. per cwt., net cash, according to quantity.
Sodium Nitroprusside.—16s. per lb.
Sodium Potassium Tartrate (Rochelle Salt).—75s. per cwt., for ton lots and upwards.
Sodium Salicylate.—Powder, 2s. 2d. to 2s. 3d. per lb. Crystal, 2s. 3d. to 2s. 5d. per lb. Flake, 2s. 6d. per lb. Strong demand, market firmer.
Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb.
Sodium Sulphite, anhydrous, £27 10s. per ton, minimum 5 ton lots, according to quantity; 1-cwt. kegs included.
Sulphonal.—13s. per lb. accepted for quantity.
Thymol.—16s. per lb.

Perfumery Chemicals

Acetophenone.—10s. 9d. per lb.
Aubepine.—11s. 3d. per lb.
Amyl Acetate.—3s. per lb.
Amyl Butyrate.—6s. 6d. per lb.
Amyl Salicylate.—3s. 1½d. per lb.
Anethol (M.P. 21/22° C.).—4s. 6d. per lb.
Benzyl Acetate from Chlorine-free Benzyl Alcohol.—2s. 7½d. per lb.
Benzyl Alcohol free from Chlorine.—2s. 7½d. per lb.
Benzaldehyde free from Chlorine.—3s. 1½d. per lb.
Benzyl Benzoate.—3s. 1½d. per lb.
Cinnamic Aldehyde Natural.—16s. per lb.
Coumarin.—14s. 9d. per lb.
Citronellol.—22s. per lb.
Citral.—10s. per lb.
Ethyl Cinnamate.—10s. per lb.
Ethyl Phthalate.—3s. per lb.
Eugenol.—10s. 6d. per lb.
Geraniol (Palmarosa).—28s. 6d. per lb.
Geraniol.—9s. 6d. to 18s. 6d. per lb.
Heliotropine.—6s. 3d. per lb.
Iso Eugenol.—15s. per lb.
Linalol ex Bois de Rose.—24s. 6d. per lb.
Linalyl Acetate.—24s. 6d. per lb.
Methyl Anthranilate.—10s. per lb.
Methyl Benzoate.—5s. per lb.
Musk Ambrette.—50s. per lb.
Musk Ketone.—42s. 6d. per lb.
Musk Xylol.—11s. per lb.
Nerolin.—4s. 6d. per lb.
Phenyl Ethyl Acetate.—15s. per lb.
Phenyl Ethyl Alcohol.—14s. per lb.
Rhodinol.—40s. per lb.
Safrol.—1s. 8d. per lb.
Terpineol.—1s. 10d. per lb.
Vanillin.—25s. to 25s. 6d. per lb.

Essential Oils

Almond Oil, Foreign S.P.A.—13s. 9d. per lb.
Anise Oil.—2s. 9d. per lb.
Bergamot Oil.—16s. per lb.
Bourbon Geranium Oil.—22s. 6d. per lb.
Camphor Oil.—62s. 6d. per cwt.
Cananga Oil, Java.—11s. per lb.
Cinnamon Oil, Leaf.—6d. per oz.
Cassia Oil, 80/85%,—10s. per lb.
Citronella Oil.—Java, 85/90%, 4s. 10d. per lb. Ceylon, 2s. 8d. to 2s. 11d. per lb., according to quality. Cheaper.
Clove Oil.—7s. 6d. per lb.
Eucalyptus Oil, 70/75%.—2s. per lb.
Lavender Oil.—French 38/40% Esters, 35s. per lb.
Lemon Oil.—3s. 9d. per lb.
Lemongrass Oil.—5s. 9d. per lb.
Orange Oil, Sweet.—11s. 3d. per lb.
Palma Rose Oil.—15s. 3d. per lb.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, May 1, 1925.

THERE has been a rather better tone in the Heavy Chemical Market during the past week, the volume of inquiry being good.

In regard to prices, Acetic Acid is rather cheaper and Arsenic shows a further decline.

Industrial Chemicals

ACID ACETIC.—98/100%, unchanged at £56 to £67 per ton according to quality and packing, c.i.f. U.K. ports. 80% quoted slightly cheaper. Pure quoted £40 to £42 per ton; technical, £39 to £41 per ton, packed in casks, c.i.f. U.K. ports.

ACID BORIC.—Price remains unchanged. Crystal, granulated or small flaked, £40 per ton; powdered, £42 per ton, carriage paid U.K. stations, minimum ton lots.

ACID CARBOLIC, ICE CRYSTALS.—Still in poor demand. Nominally 5d. per lb. delivered, but could probably be obtained at a fraction less.

ACID CITRIC, B.P. CRYSTALS.—Unchanged at about 1s. 4½d. per lb., less 5% ex store, spot delivery. In usual steady demand.

ACID FORMIC, 85%.—Offered from the continent at £48 per ton, c.i.f. U.K. ports. Spot lots quoted £49 10s. per ton, ex wharf.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy ex works.

ACID NITRIC, 80°.—Usual steady demand quoted £23 15s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—Spot material unchanged at about 4d. per lb., ex store, with slight reduction for large quantities. Quoted 3¾d. per lb., ex wharf, for early delivery.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Spot material unchanged at 11¾d. per lb., less 5% ex store. Offered for prompt shipment from the continent at ¼d. per lb. less.

ALUMINA SULPHATE, 17/18% IRON FREE.—Quoted £6 15s. per ton, ex store, spot delivery. Offered for prompt shipment from the continent at about £6 5s. per ton, c.i.f. U.K. ports.

ALUM, LUMP POTASH.—Spot lots unchanged at about £9 10s. per ton. Offered for prompt shipment from the continent at £8 5s. per ton, c.i.f. U.K. ports.

AMMONIA ANHYDROUS.—Quoted 1s. 4½d. per lb., ex station. Containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks, delivered U.K. ports.

AMMONIA LIQUID, 880°.—In steady demand. Unchanged at 2½d. to 3d. per lb., delivered according to quantities.

AMMONIA MURIATE.—Grey galvanisers' crystals of English manufacture quoted at about £29 per ton, ex store. Offered from the continent at £25 10s. per ton, c.i.f. U.K. ports. Fine white crystals of continental manufacture quoted £20 5s. per ton, c.i.f. U.K. ports.

ARSENIC, WHITE POWDERED.—Still further reduced in price. Spot material now quoted £27 per ton, ex store. Offered for early delivery at about £25 10s. per ton, ex wharf.

BARIUM CHLORIDE, 98/100%.—English material unchanged at about £10 5s. per ton, ex store. Foreign material on offer at £8 15s. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—Spot lots quoted £10 10s. per ton, ex station; contracts 20s. per ton less.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. ports.

BORAX.—Remains unchanged. Granulated, £24 10s. per ton; crystals, £25 per ton; powdered, £26 per ton, carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English makers' price unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, ex station. Continental quoted £3 15s. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 5s. per ton, ex works, packed in casks free.

COPPER SULPHATE.—English material unchanged at about £24 10s. per ton, f.o.b. U.K. port. Continental quoted about £22 10s. to £23 per ton, c.i.f. U.K. ports.

FORMALDEHYDE, 40%.—In very little demand. Spot material on offer at about £42 per ton, ex store. Offered for prompt shipment from the continent at about £40 per ton, ex wharf.

GLAUBER SALTS.—White crystals of English manufacture unchanged at £4 per ton, ex store or station. Continental on offer at about £3 5s. per ton, c.i.f. U.K. ports.

LEAD, RED.—Quoted £42 per ton, ex store, spot delivery. Offered for prompt shipment from the continent at about £40 10s. per ton, c.i.f. U.K. ports.

LEAD, WHITE.—Now quoted £44 per ton, ex store.

LEAD, ACETATE.—Refined white crystals offered from the continent at about £43 15s., c.i.f. U.K. ports. Spot material quoted £45 10s. per ton, ex store.

LEAD, NITRATE.—Unchanged at about £41 per ton, ex store.

MAGNESITE, CALCINED.—Quoted £8 per ton, ex station, prompt delivery.

MAGNESIUM, CHLORIDE.—Quoted £2 15s. per ton, c.i.f. U.K. ports, prompt shipment.

POTASH CAUSTIC, 88/92%.—Unchanged at about £29 per ton, ex wharf, prompt shipment from the continent. Spot material available at about £30 10s. per ton, ex store.

POTASSIUM BICHROMATE.—Price for home consumption 5d. per lb., delivered.

POTASSIUM CARBONATE, 96/98%.—Spot material unchanged at about £25 15s. per ton, ex store. Offered for prompt shipment from the continent at about £25 5s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE.—Spot material unchanged at about 4d. per lb., ex store. Offered for early delivery at 3¾d. per lb., c.i.f. U.K. ports.

POTASSIUM NITRATE, SALTPETRE.—Refined granulated 99% quoted at about £28 per ton, ex store. Quoted £24 10s. per ton, c.i.f. U.K. ports, for prompt shipment from the continent.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 7¾d. per lb., ex store. Offered for early delivery at 7½d. per lb., ex wharf.

POTASSIUM PRUSSIATE, YELLOW.—Spot material now available at about 7¼d. per lb., ex store. Offered for early delivery at a fraction less.

SODA CAUSTIC.—76/77%, £18 per ton; 70/72%, £16 12s. 6d. per ton; broken, 60%, £17 2s. 6d. per ton; powdered, 98/99%, £21 7s. 6d. per ton. All carriage paid U.K. stations, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—On offer from the continent at about £19 10s. per ton, c.i.f. U.K. ports. Spot material quoted £21 10s. per ton, ex store.

SODIUM BICARBONATE.—Refined recrystallised quality £10 10s. per ton ex quay or station. M.W. quality 30s. per ton less.

SODIUM CARBONATE.—Soda crystals £5 to £5 5s. per ton ex quay or station. Powdered or pea quality £1 7s. 6d. per ton more, alkali 58% £8 12 3d. per ton ex quay or station.

SODIUM HYPOSULPHITE.—English material quoted £9 15s. per ton ex station. Continental about £8 5s. per ton c.i.f. U.K. ports. Pea crystals of English manufacture at £14 per ton ex station.

SODIUM NITRATE.—Ordinary quality quoted £13 7s. 6d. per ton ex store. 96/98% refined quality, 7s. 6d. per ton extra.

SODIUM NITRIC 100%.—Offered from the continent at about £23 per ton, c.i.f. U.K. ports. Spot material available at about £24 15s. per ton, ex store.

SODIUM PRUSSIATE, YELLOW.—Quoted 4d. per lb., ex store, spot delivery, but could probably be obtained at a fraction less.

SODIUM SULPHATE, SALTCAKE.—Price for home consumption, £3 10s. per ton f.o.r. works. Good inquiry for export and higher prices obtainable.

SODIUM SULPHIDE.—English manufacturers quote: 60/62% solid, £15 per ton; broken, £1 per ton more; flake, £2 per ton more; crystals, 31/34, £9 5s. per ton, carriage paid U.K. stations, minimum 4 ton lots with slight reduction for contracts over a period; 60/62% solid offered at about £11 per ton, c.i.f. U.K. ports from the continent; broken, £12 per ton c.i.f. U.K. ports; 30/32% crystals, £8 5s. per ton, c.i.f. U.K. ports.

SULPHUR.—Flowers, £9 10s. per ton; roll, £8 10s. per ton; rock, £8 7s. 6d. per ton; ground, £8 5s. per ton, ex store, prices nominal.

SULPHUR.—American crude sulphur on offer at about £5 2s. 6d. per ton, c.i.f. U.K. ports.

ZINC CHLORIDE.—97/98% of continental manufacture quoted £23 per ton, c.i.f. U.K. port. English material for export on offer at about £25/£26 per ton f.o.b. U.K. port.

ZINC SULPHATE.—In moderate demand and price unchanged at about £12 10s. per ton, ex store.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

BENZIDINE BASE.—Some home inquiries. Price, 3s. 3d. to 3s. 6d. per 100%.

R. SALT.—Some home inquiries. Price 2s. 4d. per lb. per 100%.

H. ACID.—Some home inquiries. Price 3s. 6d. to 3s. 8d. per lb. per 100%.

PARANITRANILINE.—Home and export inquiries. Price, 2s. 2d. per lb.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, May 1, 1925.

The past week has shown no important change in the position of the chemical market here, either from the point of view of weight of business actually done or the movements of prices. Buyers have been operating on the quiet lines to which traders have become accustomed lately, and individual transactions have been of comparatively small volume. Home demand is, of course, seriously affected by the depression in the consuming industries. Export business is also quiet. For most lines values keep steady to firm, but here and there there is a slightly easier tendency.

Heavy Chemicals

Prussiate of soda is selling in moderate quantities and there is little change in price, which hovers round 3¾d. per lb. Sulphide of sodium is also in small demand; 60–65 per cent. concentrated is on offer at £13 15s., and crystals at £9 10s. per ton. Caustic soda meets with a quietly steady demand, and values are maintained at from £15 12s. 6d. per ton for 60 per cent. quality to £18 for 76–77 per cent. Saltcake is about unchanged at round £4 per ton, but business is on a small scale. Glauber salts are quiet but fairly steady at £3 10s. per ton. Chlorate of soda meets with a fair demand at 2¾d. per lb. Bleaching powder is not too active, but quotations remain at £9 10s. per ton. Hyposulphite of soda is quiet at £13 10s. to £13 15s. per ton for photographic crystals and £9 5s. for commercial quality. Alkali is in fairly good request at £6 15s. per ton. Bicarbonate of soda is still on offer at £10 10s. per ton, but the demand is rather poor. Soda crystals meet with a moderate amount of business at the unchanged price of £5 5s. per ton. Phosphate of soda is quiet and a shade easier at £12 15s. per ton. Acetate of soda is in rather small demand, with current quotation at about £19 10s. per ton. Bichromate of soda is steady and in moderate inquiry at round 4d. per lb.

The demand for caustic potash and carbonate of potash is not very brisk, but values keep up to the levels recently reported. Caustic potash is on offer at round £30 per ton, and carbonate at £24 10s. to £25. Prussiate is only in quiet request, though prices continue at about 7d. per lb. Permanganate of potash varies from about 6½d. per lb. for commercial quality to 7½d. for pharmaceutical, a moderate amount of business being done. Bichromate of potash is rather quiet, but quotations are held at 5d. per lb. Chlorate of potash is on offer at 3¼d. per lb.

The demand for sulphate of copper continues on restricted lines; to-day's value is £24 to £24 10s. per ton. Arsenic is still very dull, demand for both home and export being quiet; prices are weak, and £28 per ton is now quoted in Manchester. Commercial Epsom salts are steady and in fair inquiry at £4 10s. to £4 12s. 6d. per ton; magnesium sulphate, pharmaceutical quality, is still offering at about £6 per ton. Nitrate of lead is rather slow, but values are steady at round £41 10s. per ton. Acetate of lead is quiet but unchanged at £45 per ton for white and about £41 for brown. Acetate of lime is in moderate demand and prices are fairly steady; grey is on offer at £14 10s. to £15 per ton, and brown at £9 10s.

Acids and Tar Products

Business in the acid products is comparatively quiet, but values are not much altered from last week. Acetic acid is steady at about £40 per ton for 80 per cent. commercial and about £67 per ton for glacial. Oxalic acid is attracting limited attention at 3¾d. per lb. Tartaric acid is quoted at 11¾d. to 1s. per lb., and citric at 1s. 4d. to 1s. 4½d.

Among the coal-tar products pitch keeps dull and nominal at round 40s. per ton. Creosote oil is quiet at 6¼d. per gallon. Naphthalenes are in small request and easy at £14 10s. per ton for refined quality and from £4 10s. for crude. Carbolic acid is neglected; crystals are quoted at 5d. per lb. and crude at about 1s. 7d. per gallon. Solvent naphtha is easy at 1s. 5d. per gallon.

Company News

Parkes Chemists.—The directors recommend a final dividend of 5 per cent., less tax, on the ordinary shares, making with the interim dividend of 2½ per cent., less tax, already paid 7½ per cent. for the year ended February 28, 1925.

Lautaro Nitrate Co.—The report for the year ended December 31 last states that the net profit amounted to £671,375, to which is added £147,377 brought in, making a total of £818,752. Dividends paid during the year totalled 15 per cent., leaving a balance to be carried forward of £372,149.

Val de Travers Asphalte Co.—For the year 1924 the net profits were £36,625, which with £19,344 brought forward, amounts to £55,969. A further dividend of 1s. 6d. per share, less tax, is recommended on shares 1 to 196,000, making 10 per cent.; and on shares 196,001 to 282,728, a dividend of 2s. per share or 10 per cent., less tax, is proposed, leaving to be carried forward £20,796.

Arizona Copper Co.—The directors have resolved to recommend the payment of a dividend for the year to March 31 last of 1s. 6d. per share, tax free, on the ordinary shares of the company, on which 9d. per share was paid on November 25 last. The balance of 9d. per share will be paid on May 30 to shareholders registered on the books of the company at the close of business on May 9.

Anton Jurgen's United Margarine Works. — The trading profits for the year 1924 were £1,651,495, and £705,457 was brought forward. Directors' fees absorb £2,083, salaries, auditors' fees, etc., £8,172, interest on debentures, £200,000, and depreciation of factory, etc., £6,895. It is proposed to add £83,333 to the redemption fund, and £416,667 to the reserve, to pay the dividend on the preference shares, and to carry forward the remaining £736,821.

Bryant and May, Ltd.—The net profits for the year ended March 31 last, amounted to £346,389, and the balance brought forward was £32,330, making together £378,719. The directors recommend placing £100,000 to reserve fund and the payment of further dividends for the half year ended March 31, at the same rates as for the first half year, namely, on the preference shares at the rate of 14 per cent. per annum, on 931,011 ordinary shares, 4 per cent., free of tax, and on 44,214 partnership shares 4 per cent., free of tax. They also recommend, under Brymay co-partnership, 4½ per cent. on the ordinary shares, free of tax, requiring £41,895, carrying forward £49,710.

J. Mandleberg and Co., Ltd.—The annual report for the period to December 19 last states that the net profits amount to £85,115, and £54,678 was brought forward, making a total available balance of £139,793. There has been transferred to the depreciation fund £3,500, and the directors recommend the payment of a dividend of 10 per cent., less tax, for the year on the ordinary shares (including the interim dividend for the half-year to June 19, 1924, at the rate of 10 per cent. per annum, already paid), and a bonus of 2½ per cent., less tax, both dividend and bonus being calculated in respect of partly paid shares on the amount for the time being paid up thereon. There is a balance to carry forward of £60,125.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

Linseed Oil.—A firm of manufacturers' agents in Chicago desires representation of British manufacturers of linseed oil on a commission basis. (Reference No. 533.)

Oils, Greases, Fertilisers.—A broker in New Orleans wishes to represent British exporters of palm oil, cocoanut oil, palm kernel oil, palm nuts, copra, greases, and fertiliser material. As regards oils and greases he is prepared to cover the entire United States, the fertiliser material agency to include the States of Arkansas, Louisiana, Mississippi, Alabama, Tennessee and Texas. Terms: commission basis. (Reference No. 530.)

Grinding Wheels, Etc.—An agent established in Zurich wishes to represent British firms for the sale in Switzerland

of corundum and carborundum grinding wheels, emery cloth, and grinding machinery. (Reference No. 528.)

OILS.—A commission agent in Copenhagen desires to hear from the British exporters of oils and other raw materials for the margarine industry. (Reference No. 514.)

WHITE LEAD.—The directors of the Madras and Southern Mahratta Railway Company, Ltd., are prepared to receive tenders for 26½ tons white lead in accordance with specifications at the offices of the Company, 25, Buckingham Palace Road, London, S.W.1. Charge for the specification for white lead is one guinea, which will not be returned. Tenders, addressed to Secretary, not later than May 19, 1925.

TECHNICAL OILS AND FATS.—An agent established in Zurich wishes to represent British firms for the sale in Switzerland of technical oils and fats. (Reference No. 494.)

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the registration of the following Trade Marks can be lodged up to May 15, 1925.

"STANCO."

450,209. For carbon black. The Standard Carbon Co. (a corporation organised and existing under the laws of the State of Delaware, United States of America), 610, Quachita National Bank Building, Monroe, State of Louisiana; and 294, Washington Street, Boston, Massachusetts, United States of America; manufacturers. July 15th, 1924.

"METTEX."

457,137. For chemical substances used in manufactures, and anti-corrosives. Sozol (1924), Ltd., 20, Copthall Avenue, London, E.C.2; manufacturers of rust preventives. March 13, 1925.

"MONSOL."

455,798. For chemical substances used for agricultural, horticultural, veterinary and sanitary purposes. The Mond Tar By-Products Syndicate, Ltd., 47, Victoria Street, London, S.W.1; merchants. January 29, 1925. (To be associated. Sect. 24.)

"MONSOL."

455,799. For chemical substances prepared for use in medicine and pharmacy. The Mond Tar By-Products Syndicate, Ltd., 47, Victoria Street, London, S.W.1; merchants. January 29, 1925. (To be associated. Sect. 24.)

"DYESIL."

455,870. For raw, or partly prepared, vegetable, animal, and mineral substances used in manufactures, not included in other classes. Class 4. Lever Brothers, Ltd., Port Sunlight, Cheshire; manufacturers. January 31, 1925. (To be associated. Sect. 24.)

Opposition to the Registration of the following Trade Marks can be lodged up to May 22, 1925.

"ASCARITE."

456,222. For a sodium-hydrate asbestos absorbent, being a chemical substance for determining carbon in steel by the direct combustion method. Arthur H. Thomas Company, Incorporated, (a corporation duly organised under the laws of the State of Pennsylvania, United States of America), West Washington Square, 230, South 7th Street, Philadelphia, State of Pennsylvania, United States of America, manufacturers. February 12, 1925.

"KODALOID."

456,804. For chemical substances used in manufactures, photography or philosophical research and anti-corrosives. Class 1. Kodak, Limited, Kodak House, Kingsway, London, W.C.2, manufacturers and dealers. March 3, 1925. (To be Associated. Section 24.)

Opposition to the Registration of the following Trade Mark can be lodged up to May 29, 1925.

"THEOMINAL."

456,640. For chemical substances prepared for use in medicine and pharmacy. Bayer Products, Ltd., 32 to 34, Basinghall Street, London, E.C.2, merchants and manufacturers. February 26, 1925.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry make no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

CAMPBELL BROTHERS, 48, Higher Market Street, Farnworth, Bolton, art dyers and dry cleaners. (C.C., 2/5/25.) £19 2s. 10d. March 24.

REXEMCO MANUFACTURING CO., 30, Cockspur Street, Liverpool, paint manufacturers. (C.C., 2/5/25.) £20 6s. 7d. March 25.

WILSON BROTHERS, Colour Works, Farnworth, chemical manufacturers. (C.C., 2/5/25.) £12 18s. 1d. March 26.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

RAIMES AND CO., LTD., Stockton-on-Tees, polish manufacturers. (M., 2/5/25.) Registered April 16, £8,500 debentures to A. L. Raimes, High Street, Yarm-on-Tees, director of the company and others; charged on properties at Stockton-on-Tees; also general charge (subject to prior charges). *£14,800. March 21, 1924.

Receivership

HEATH AND COMPANY, LTD. (R., 2/5/25.) Joseph Stephenson (of Stephenson, Smart and Co., 78, Old Broad Street, London, E.C.2) has been appointed receiver on behalf of the first debenture holders.

London Gazette

Company Winding Up

CHLOROPHYL AND CHEMICAL CORPORATION, LTD.—Meetings of creditors, May 7, 11.30 a.m., and contributories, May 7, 12 noon; 33, Carey Street, Lincoln's Inn, London, W.C.2.

Company Winding Up Voluntarily

AMELIA NITRATE CO., LTD., (C.W.U.V., 2/5/25.) By Special Resolution April 2, confirmed April 17, C. A. Huni, River Plate House, Finsbury Circus, London, E.C.2, appointed Liquidator.

Notice of Intended Dividend

STEVEN, George, manufacturing chemist, 118, Chorlton Road, Old Trafford, trading as G. STEVEN AND COMPANY. Last day for receiving proofs, May 12, Trustees, A. Yearsley, 27, Brazennose Street, Manchester; A. T. Eaves, 47, Mosley Street, Manchester.

New Companies Registered

BRITISH SPEEDWELL CO., LTD., Blackfriars House, New Bridge Street, London. Distributors and selling agents of oil and similar commodities; manufacturers of and dealers in petrol, petroleum, paraffin, pitch, tar, tar distillates, bitumens, varnishes, paints, etc. Nominal capital, £25,000 in £1 shares.

WARTON ROAD WHARF, LTD. Public wharfingers, storers and warehousers of oils, fats, lubricants, and chemicals of all kinds; distillers, filterers, refiners, etc. Nominal capital, £100 in £1 shares. A director: Captain V. T. D. Palmer, Heronden Hall, Tenterden, Kent.